Smithsonian

June 1984

Wrestlers begin a match:
how things really were
at the first Olympics (p. 64)

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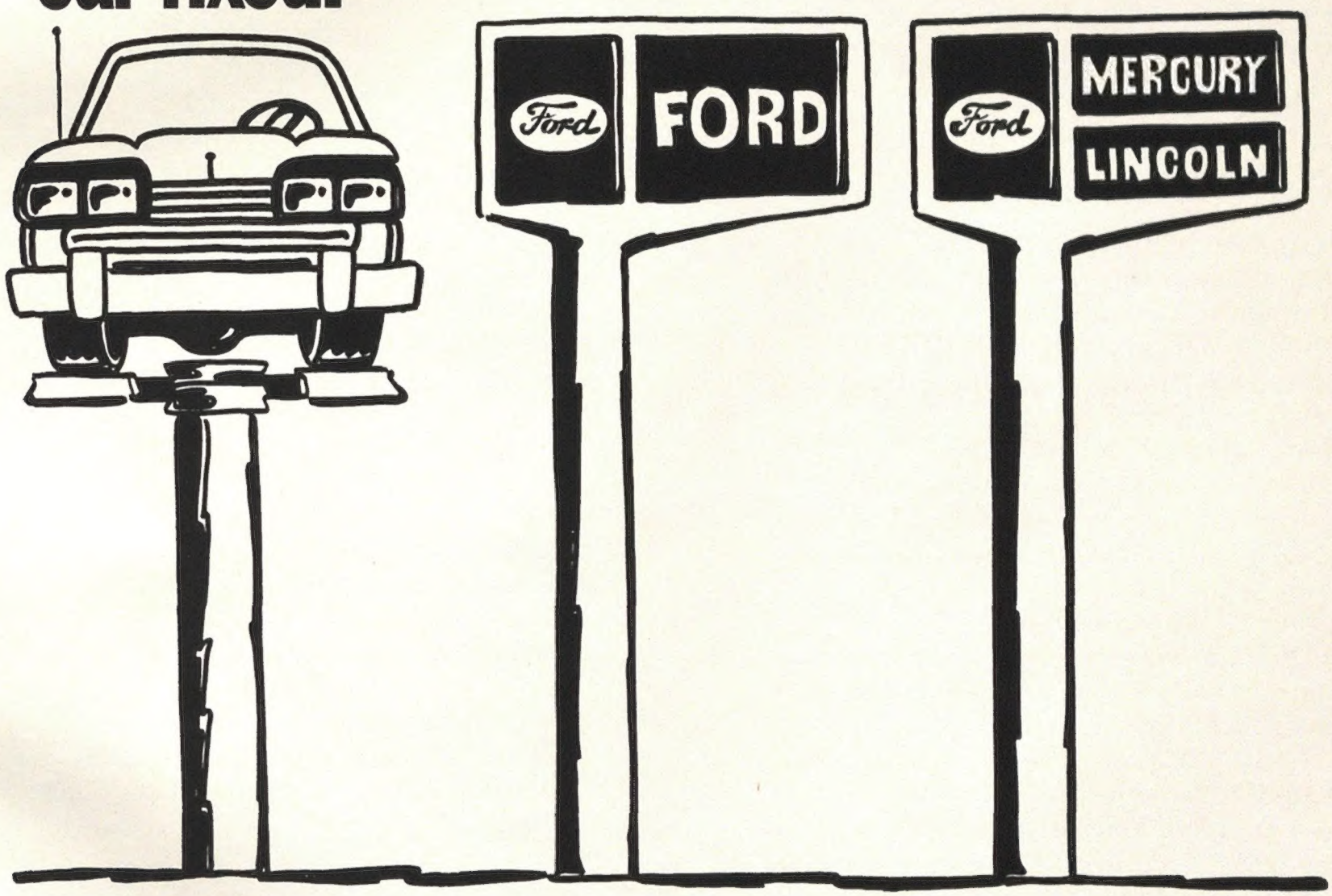

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LIFETIME SERVICE GUARANTEE

WE FIX CARS FOR KEEPS.

June 1984

Smithsonian

Volume 15, No. 3

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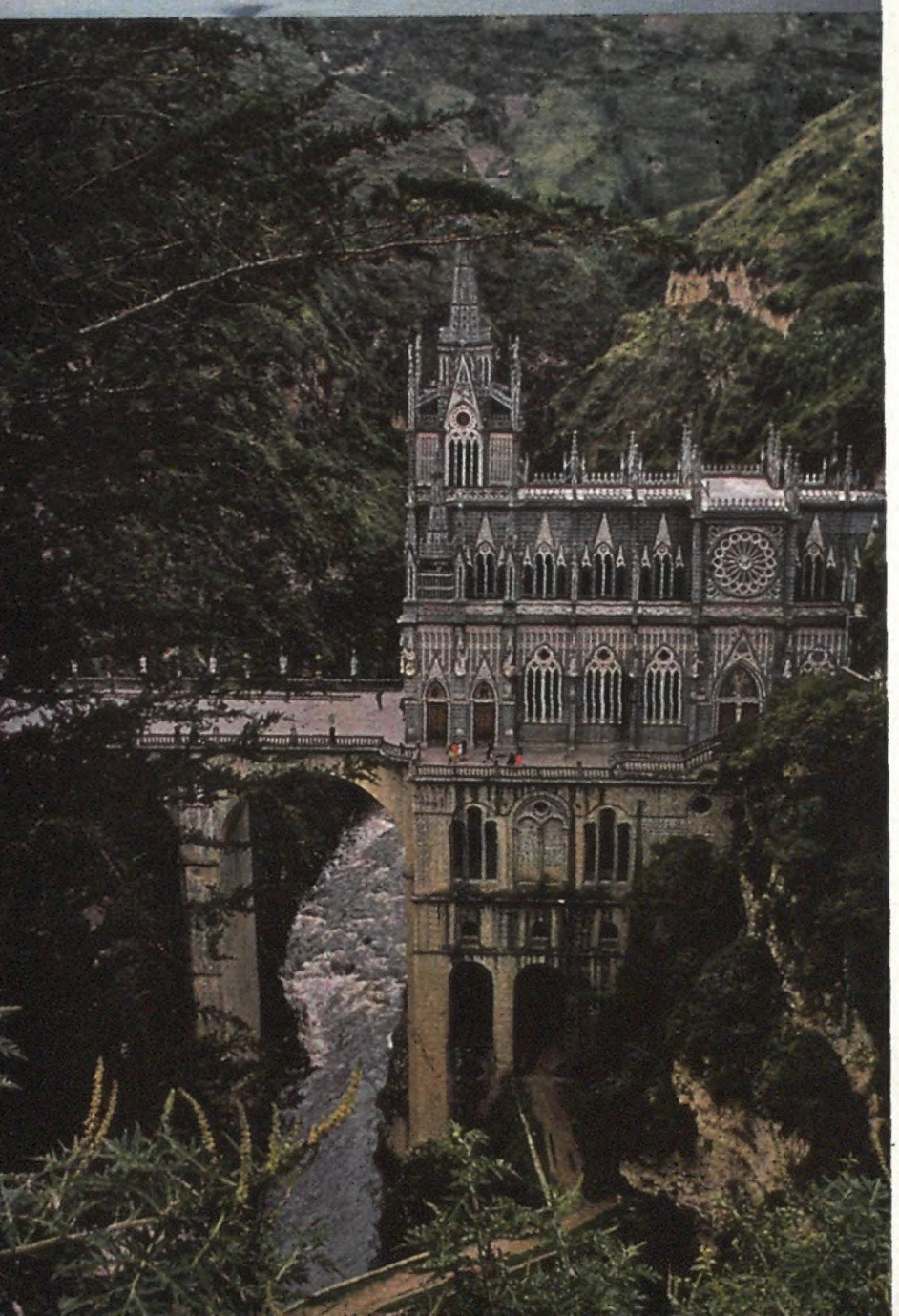

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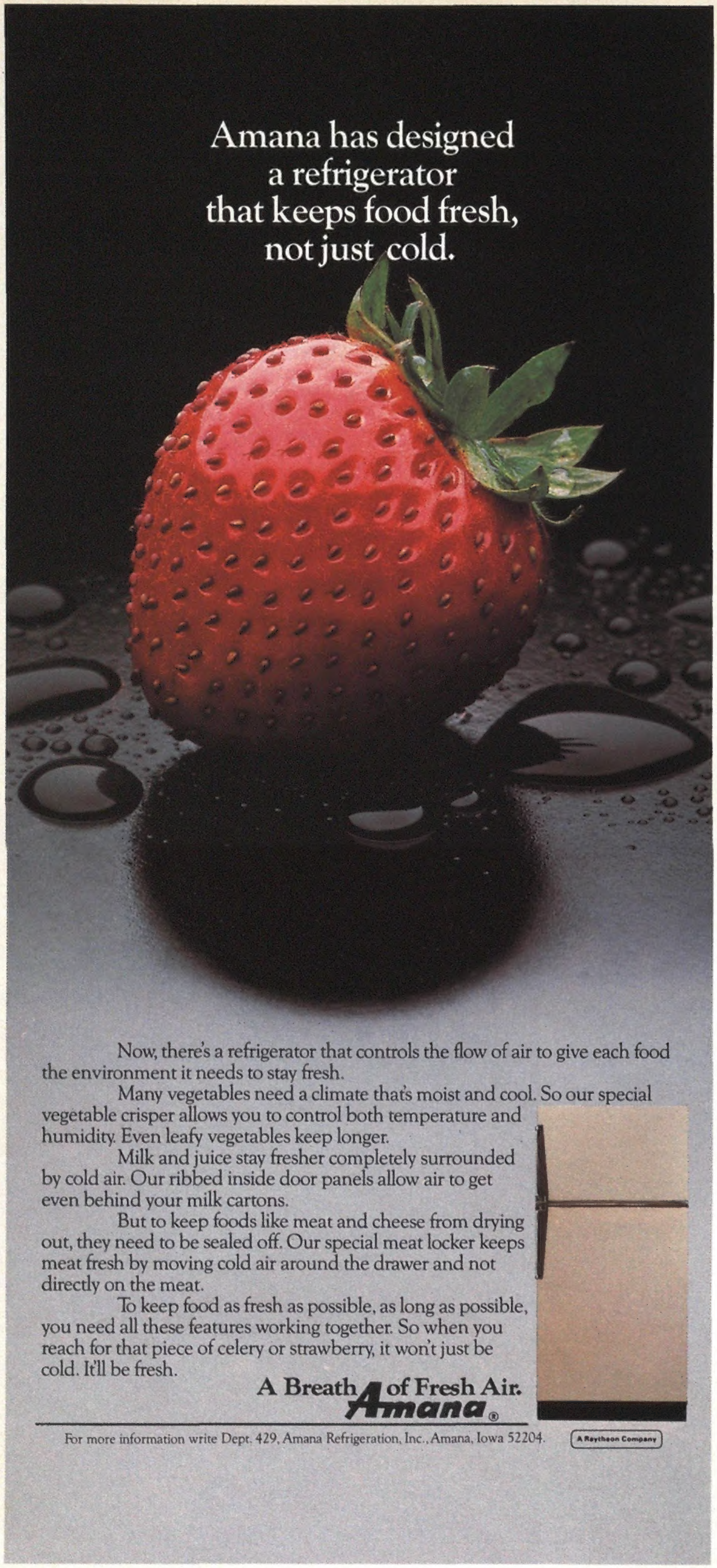
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After thorough evaluation, they confirmed the performance of what is unquestionably one of the most sophisticated fuel injection systems in the world.

We didn't stop there. Bosch technicians drove it through oxygen-thin altitudes and steep grades of the Alps. While a similar prototype was put through the searing heat of the Australian Outback. All because we're convinced that today, mere luxury simply isn't enough.

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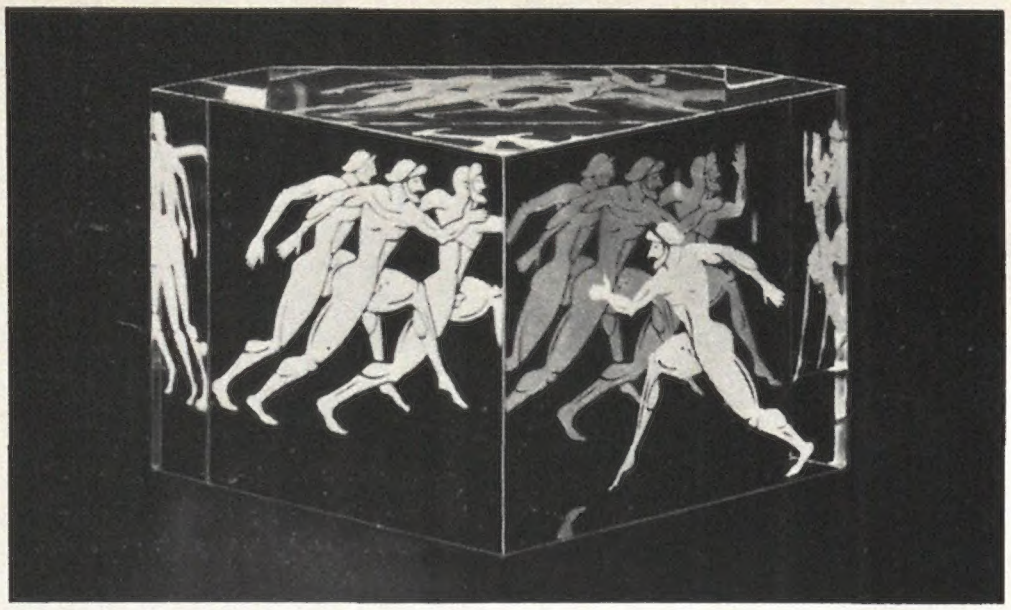

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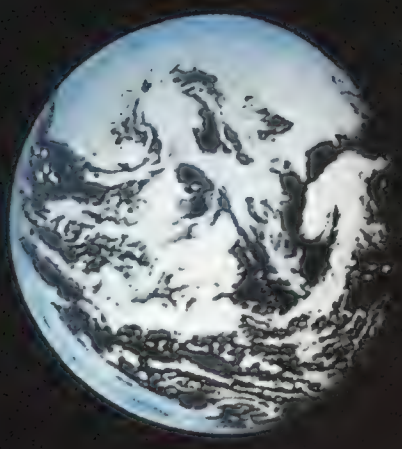

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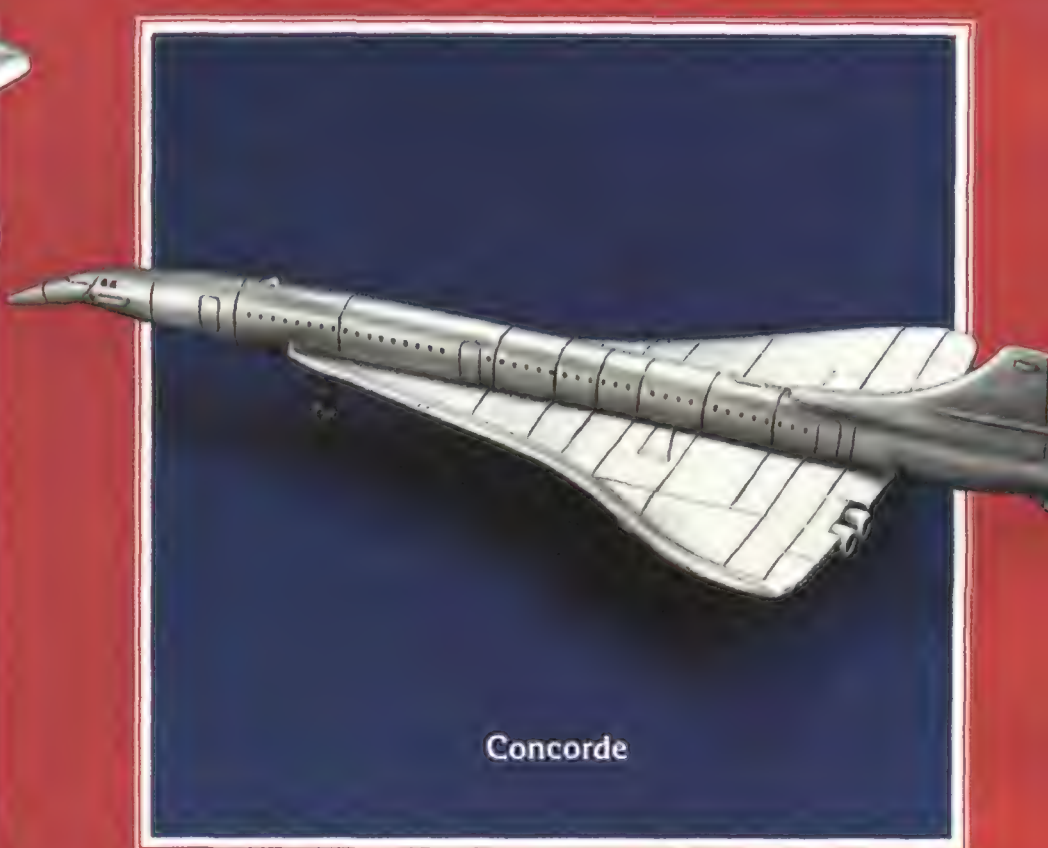

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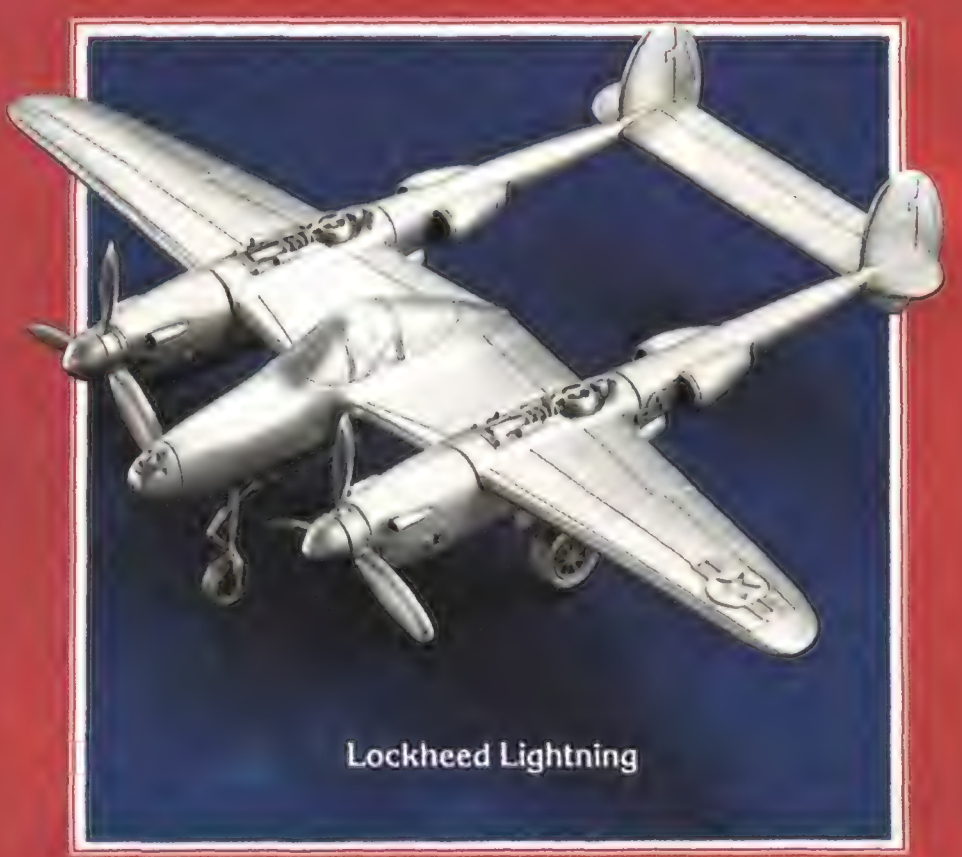

Lockheed Lightning

Replicas shown much smaller than actual sizes which range up to a full 8" in wingspan or length.

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Here also is the **Lockheed Lightning.** This is the plane our pilots vowed would "pay 'em back" for Pearl Harbor. And it did – destroying more enemy aircraft in the Pacific than any other fighter!

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The view from the castle

From the Mediterranean range, good news about the population growth and graceful habits of a rare seagull

North of Agadir on the Atlantic coast of Morocco there is a massive cape, Cap Rhir, which juts out into the greenish-gray sea. We had come to Agadir, now a small tourist mecca for holiday groups from Europe, for our own reasons. With us was a French ornithologist from the Institute of Science in Rabat. We wanted to survey the beaches north and south of the great cape, where small rivers come down nearly to the sea but are too weak to break through, creating lagoons or backed-up ponds behind heavy sandbars. Here strings of gulls are at rest. In March these were mostly herring gulls or lesser black-backed gulls, which are familiar species in Europe.

But here also is the wintering ground, or migration route, of one of the rarest seagulls in the world, Audouin's gull. This is a species unique to the Mediterranean area.

In the 1950s I helped to start a list of the most-threatened species of birds in the world, and Audouin's gull was considered one of the most vulnerable. No one seemed to know then how many of these beautiful gulls were still alive. The bird is lovely, daintier than the coastal scavenging species. Its calls are more varied, verging on the tender and dulcet at times, unlike the shrill imprecations of the larger species so often found today near garbage dumps and "sanitary landfills."

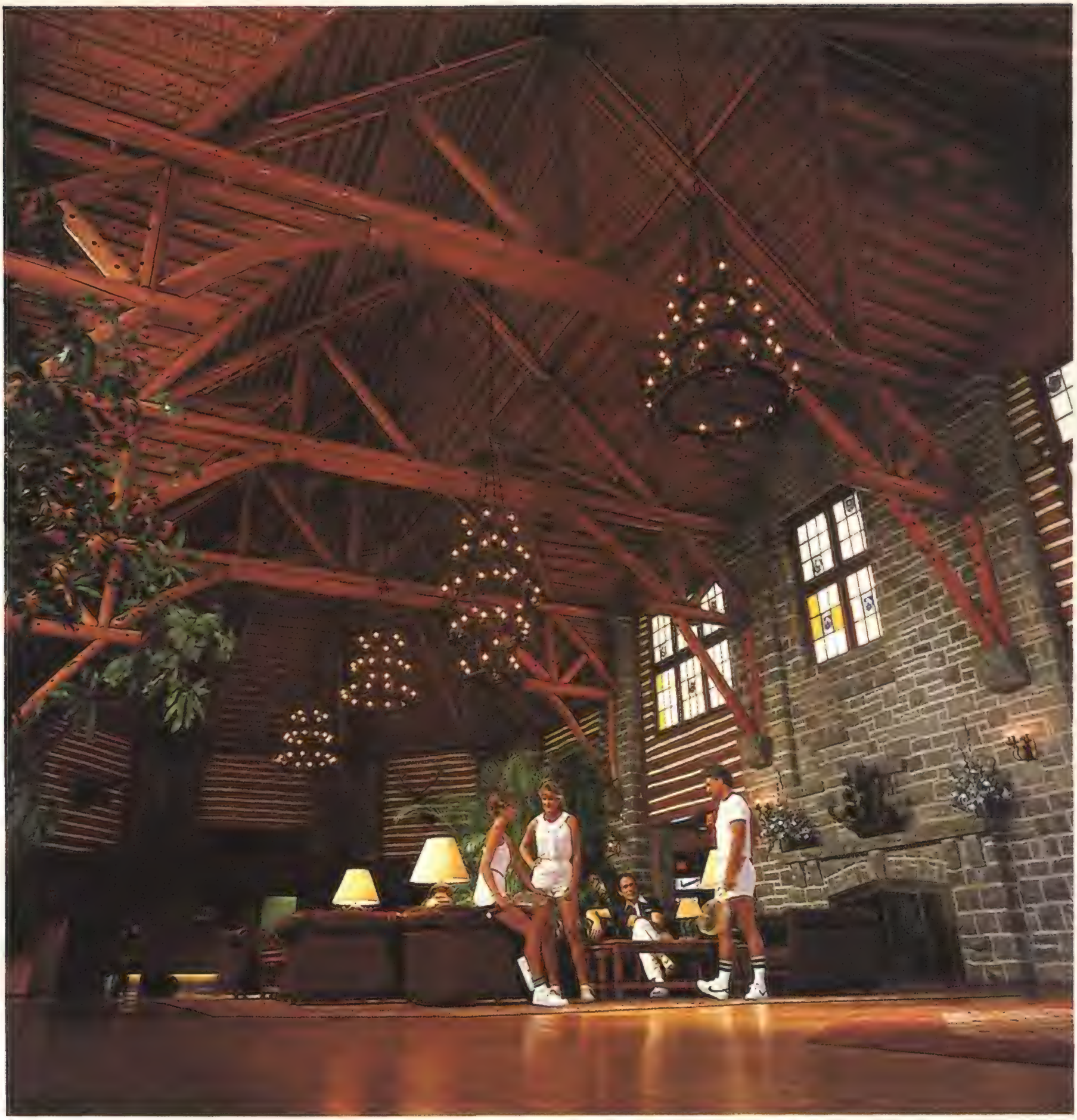
In plumage Audouin's is soft dove-gray above, merging into black wing tips, with two or three white spots at the ends of the long primary feathers. In the adult the bill is scarlet, banded with black and with a yellow tip. The white breast often has a subtle wash of pink, which conveys a distinct sense of elegance.

As our friend M. Pierre Beaubrun explained to us, Audouin's gull nests only on tiny offshore islets or on rocky reefs, where its eggs and young are prey to men passing in small boats. By the 1950s conservationists thought its days were numbered, whether off Morocco, Corsica, Cyprus or in the Aegean, where I thought I had seen a single bird on a sandbar in the 1960s. It was said to be extinct off the coast of Syria, its population elsewhere perhaps down to the hundreds.

Now M. Beaubrun and his colleagues in Morocco have done much to add to our knowledge of this species. One of the most fascinating episodes is the contest among males for nesting sites. In a crowded colony of typical gulls, as with most seabirds, competition tends to be a fearsome business, complete with squawking, shoving, pushing, bill fighting (often nearly fatal) and gestures replete with the overtones of a riot in a fish market. But not, at least, with Audouin's, as I could see in photographs that Beaubrun showed me of two males competing for nest sites on the Chafarina islets near the Algerian border. It was a dance, a stately minuet. Would that all squabbles everywhere could be settled with such grace.

For whatever reason, the tribe of Audouin's gulls has increased in recent years. From estimates of a world population of fewer than 800 pairs in 1968, we now believe that more than 3,500 pairs populate its restricted Mediterranean range. We now know of colonies in Algeria, Spain, Corsica, Sardinia, Greece, Cyprus and Turkey. And—who knows?—in spite of bomb bursts they may reach Syria.

S. Dillon Ripley



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Letters to the Editor

Pleasure of words

Dear Sir: There is a story connected with the rebus *Ga!* which equates to *J'ai grand appétit*, mentioned in James J. Kilpatrick's article on word games. Frederick II the Great wanted to invite Voltaire to Sans Souci, his country palace, and so sent him the following rebus:

$$\frac{\text{p}}{\text{venez}} \text{ à } \frac{\text{si}}{100}$$

Phonetically, this is *venez sous pé à cent sous si*, as in French "under" is *sous* and 100 is *cent*, pronounced "sahn." Thus, *Venez souper à Sans Souci*, or "Come dine at Sans Souci."

Voltaire, not to be outdone in rebus crafting, accepted the invitation by means of the aforementioned *Ga!*
Frank Holan
Westminster, Vermont

Dear Sir: Kids love word jokes, and my mother had a store of them. My favorite was about the businessman who came home late and was greeted at the door by the maid. "What time is it, Bridget, and where's the potato pie?" She replied, "It's ate, sir."
Mary Risk Hine
Sea Cliff, New York

Dear Sir: Regarding the healthy development of the English language through the invention of new words, I would like to suggest one to describe the ever-growing threats to the future of mankind: *mankruptcy*, meaning its ruination by pollution, exhaustion of the Earth's natural resources and overbreeding.
Adolph Levy
Los Angeles

Dear Sir: The article about oddities in the English language brings to mind a whole category I have often wondered about: Has anyone ever looked into the subject of words that are used mainly in the negative form? For example, we describe a person as "uncouth" or "ruthless," but we do not refer to "the couth behavior of the ruth man." Besides these words, we have feckless, inadvertent, listless, and so on.

What light can anyone shed on words that we use in the negative form?
Robert W. Shoemaker
Naperville, Illinois

The collecting Clarks

Dear Sir: The *Sandlot Kid* sculpture portrayed in your article was a work of my father, sculptor Victor Salvatore.

The snapshot (right), a less professional work of his circa 1939, is of James McK. Symington, a Cooperstown lad who had played baseball at Groton and Yale, as well as with the semipro Cooperstown Centennials. Jim had one of the highest schoolboy batting averages in the country. I think he hit something better than .500 at Groton one year.

My father chose Jim as his model, but studied scores of batting stances before deciding on the one he used in his statue; he thought Jim's too awkward.

Jim, a rather cocky youngster, told my father the stance he had picked for the *Sandlot Kid* was not correct: "If I had batted the way that kid is standing I would never have hit a balloon." My father laughed and said, "I presume, young James, that you have heard of artistic license."

Today, that young James is Director of the Office of Membership and Development at the Smithsonian Institution.
Victor Salvatore jr.
Springfield Center, New York

Dear Sir: I was so impressed with the reproduction of Bouguereau's *Nymphs and Satyr* that I removed it from the magazine and plan to frame it. Last night, when rereading Gene Fowler's classic biography of John Barrymore, *Good Night, Sweet Prince*, I came across an account of Maurice Barrymore (the patriarch of the family) on the day of his arrival in New York City in 1875.

Barrymore walked into the Hoffman House bar [mentioned in the article] wearing a silk topper and a monocle. He ordered a whisky-and-soda without ice, the English way, and was immediately set upon by a trio of mocking Americans. Not satisfied with passive taunts, one of the Americans placed a silver dollar in his eye, leaned over to Barrymore and drawled, "I say, Percy, I suppose this is the *English* way? Wot?"

"Oh, no," replied Barrymore, removing his monocle, and settling the topper on his head. "Allow me to show you." He decked the man with a single punch, saying, "*This* is the English way!" The silver dollar spun from the man's eye and came to rest, Fowler reported, beneath Bouguereau's *Nymphs and Satyr*.

The fallen man recovered, offered Barrymore his hand, and the two of them

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Philip Berling
Kagel Canyon, California

George Washington

Dear Sir: I believe George threw the coin across the Rappahannock, not the Potomac, in the vicinity of Fredericksburg. Ferry Farm, where Washington lived as a boy, is on the Rappahannock. To get that coin across the Potomac he would have needed a cannon.

W. M. Herndon
Lompoc, California

As the story goes, it was indeed the Rappahannock. Ed.

Hazardous materials

Dear Sir: SMITHSONIAN rendered an important public service with its article on hazardous materials. Ironically, the public, in its blithe preoccupations with "the good life," seems oblivious to the many new dangers that those wonders of our high-tech age have created. The Federal Emergency Management Agency (FEMA), which is developing methods of response to these myriad hazards, finds the lack of public understanding one of its most vexing impediments.

Americans can learn to live safely in the midst of dangers posed by the production, transportation and disposal of toxic materials through proper training of local emergency-management specialists, backed up by effective public education. The National Fire Academy training described in your article is part of a full range of emergency-response courses taught at FEMA's National Emergency Training Center at Emmitsburg, Maryland. This intensive education program is aimed at providing state-of-the-art capability to deal with technological as well as natural disasters at the grass-roots level.

James Holton
Federal Emergency Management Agency
Washington, D.C.

View from the castle

Dear Sir: Having just read Secretary Ripley's moving tribute to Roger Tory Peterson, I must share with you a story:

A friend of mine, a teacher, used to spend summer vacations as a ranger at Mt. Lassen National Park. He was on duty one morning when a tourist approached, gave a brief description of the salient traits of an unusual bird he had just seen near the highway and asked whether my friend could identify it.

My friend replied, "No, I do not recognize the bird either, but I can help you. I have here a copy of Roger Tory Peterson's *Field Guide to Western Birds.*

The tourist replied, "That won't help because that bird is not in there. I am Roger Tory Peterson."

Stephen L. Brown sr.
Los Gatos, California

Terns

Dear Sir: Probably the most successful colony of least terns here is at the Camp Pendleton Marine Base just north of Oceanside. The terns decided that an area of hard-packed sand normally used for tank maneuvers and beach-landing exercises was a perfect spot to nest. The Marines now make sure the area the birds have selected is clear of any offending vegetation and is properly protected.

Gregory Kunz
La Jolla

Gary Larson

Dear Sir: Gary Larson is sick—and we love him! Aside from copies of his "Far Side" books stashed in our lab-bench drawers, the only cartoon on display is his "Great moments in evolution."

When we moved our research efforts from the University of Minnesota to Ohio State last summer, I brought our "Far Side" obsession with us.

Nancy E. Zinn
Therapeutic Immunology Laboratories
Columbus, Ohio

Fake art

Dear Sir: Several years ago at Baalbek, a "local" offered my wife some ancient coins. I asked, "Is your factory near?" He smiled. The coins were too cheap to be genuine. We bought without illusion. They were satisfactory for our purposes.

C. Lowell Harriss
New York City

The Spads of yesteryear

Dear Sir: The summer I was eight I had a new Spad kit. I was happily whittling

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away on it when a neighborhood girl stopped by and commented, "Everything you build you seem to wreck." I put up with her because her father was a World War I aviator, an ace, and she was on the honor roll. She brought her father's album to school and sure enough, there was a photo of a brand-new Spad. It just glittered in the sun, poised on an Allied airfield. I secretly hoped it would never get wrecked.

David H. Sayles
Clyde, Ohio

James McNeill Whistler

Dear Sir: I think Whistler's lightning wit was further illustrated by a double entendre when he styled himself "Apostle of Persiflage."

Feeling a subliminal tug, I confirmed that persiflage appears to come from the French root *siffler*, which means whistle.

Stuart M. Bloom, M.D.
Ventura, California

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Around the Mall and beyond

All last winter, in snow, ice, freezing rain and dank misery, some 40 men kept working doggedly at the huge mud-filled excavation where the Center for African, Near Eastern and Asian Cultures will stand (SMITHSONIAN, February 1983). Assisted by a full armament of mobile cranes, dump trucks, backhoes and bulldozers, they slogged through their jobs with the impassive fortitude of veteran infantrymen. On a damp day in early spring I put on boots, donned a hard hat and went squelching into the crater with Charlie Putnam, the General Services Administration project manager, to see what the winter warriors had wrought.

Slurry wall, is what. The excavation site for the new Quadrangle museum complex involves all of the Victorian Garden (which will be replaced, more beautiful than ever, when the construction is done), and since it goes almost 60 feet underground, it must first be bulkheaded to keep adjacent earth from collapsing during the digging. To a construction man, the problem is how to build the exterior-foundation wall. Banging down great steel beams to form a sheathing is expensive and too hard on the nearby foundation of the castle, which is 135 years old and demands a certain respect. Those are two of a number of reasons why slurry wall is better.

To get this slurry, you mix water with a clay called bentonite. It looks like thick soup, and when you pour it into a deep trench it prevents the earthen sidewalls from collapsing. Charlie showed me how a section of the retaining wall could be dug by a crane—with a narrow shovel called a clamshell—while slurry was being fed constantly into the excavation. When the trench was about 60 feet deep, all full of this soup, a monster crane lowered a prefabricated steel reinforcing cage into it. This became the skeleton for the concrete that was next on the menu.

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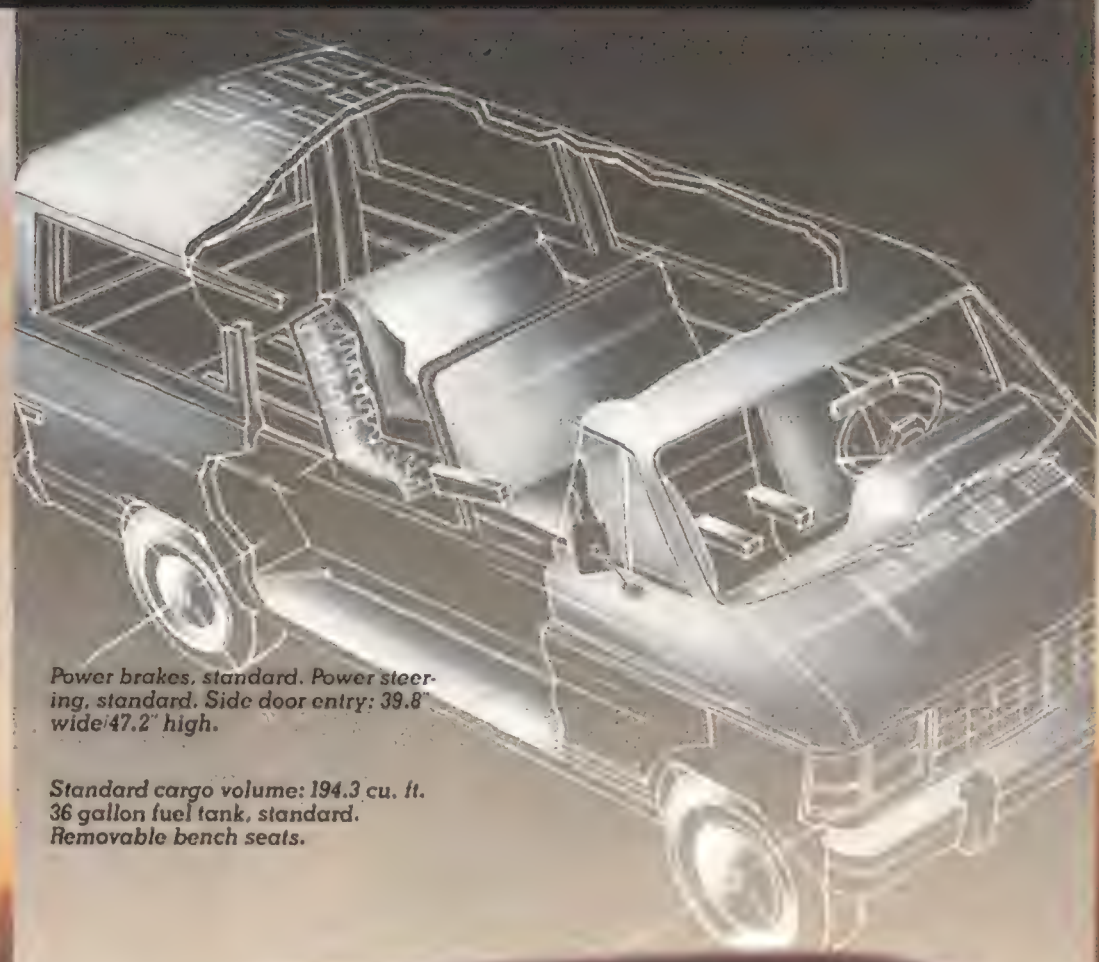

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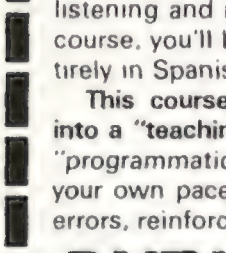

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deep, all reinforced concrete. And so the exterior structural walls were built, panel by panel, right around the construction site. It doesn't seem too complicated as I write it, but it was harder to grasp when Charlie yelled it in my ear over the roar of bulldozers and cranes, and the insistent beeping of dump trucks as they backed up for another load. I felt as though I were being instructed in the uses of artillery in the midst of a bombardment.

"The walls are done," Charlie shouted, "and right now they're held in place by dirt! But when we excavate the dirt what will happen to the walls?" It was a quiz. I could tell by the way he watched me: Come on, dummy, make with an answer.

"They'll . . . umm . . . get pressure only from the outside," I ventured. It seemed safe enough.

Charlie beamed. "And they'll fall over, of course!" he roared. "So we have to anchor them with tiebacks. Now let me show you. . . ."

I slogged after him, feeling like a replacement at Verdun. The image was heightened when I passed a boot protruding from the mud. Just the foot part. I looked at it in wild surmise. No, I told myself. Couldn't be.

Charlie introduced me to a tieback—a bundle of steel rods anchored in grout. The idea is to drill about 60 feet outside the wall to provide temporary lateral support until concrete floors are in place.

All the while, readings are taken to make certain that there will be absolutely no effect on the castle, the Freer Gallery, the Arts and Industries Building—no sideways motion, no sinking. Also, the old linden tree that, years ago, I used to park my car under is by special decree rendered immune to all excavation. Its roots *must* be protected, and when warm weather turns the site into a dust bowl, its leaves will be sprayed to keep them healthy.

I trudged out of the morass rather thoughtfully, sidestepping the crunching treads of a backhoe, dodging a giant Mack truck. I was being relieved in the trenches and was headed for R and R—Paris, maybe. Let some other poor devil plunge through the muck of the Quad. But I learned more at the Front than I had bargained for. I'd set out to discover "slurry," a great word for the folks back home: "My dear, let me explain to you about slurry. . . ." But somehow I'd become interested in the whole messy and

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powerful business—slurry, tiebacks, grout, achieving impossible goals, surmounting impossible problems and, at the end of it all, a new establishment. The changing scene is being shot in time-lapse photographs by a camera at the top of the castle for later use in a documentary film.

I hope those patient, mud-smeared, competent, ingenious infantrymen will someday find the time to go through the new center. It will always be partly theirs.

The first time I visited the Discovery Room at the Museum of Natural History, I had the rather pleasant experience of being followed around by a determined young lady who kept removing her clothes. She had been enchanted by the costume corner where kids are encouraged to try on whatever they fancy, and she felt she could speed the process by getting rid of her own garments first. That was a long time ago, and when I returned to the same place recently, I looked in vain for my young friend, wondering how much both she and her inhibitions might have grown.

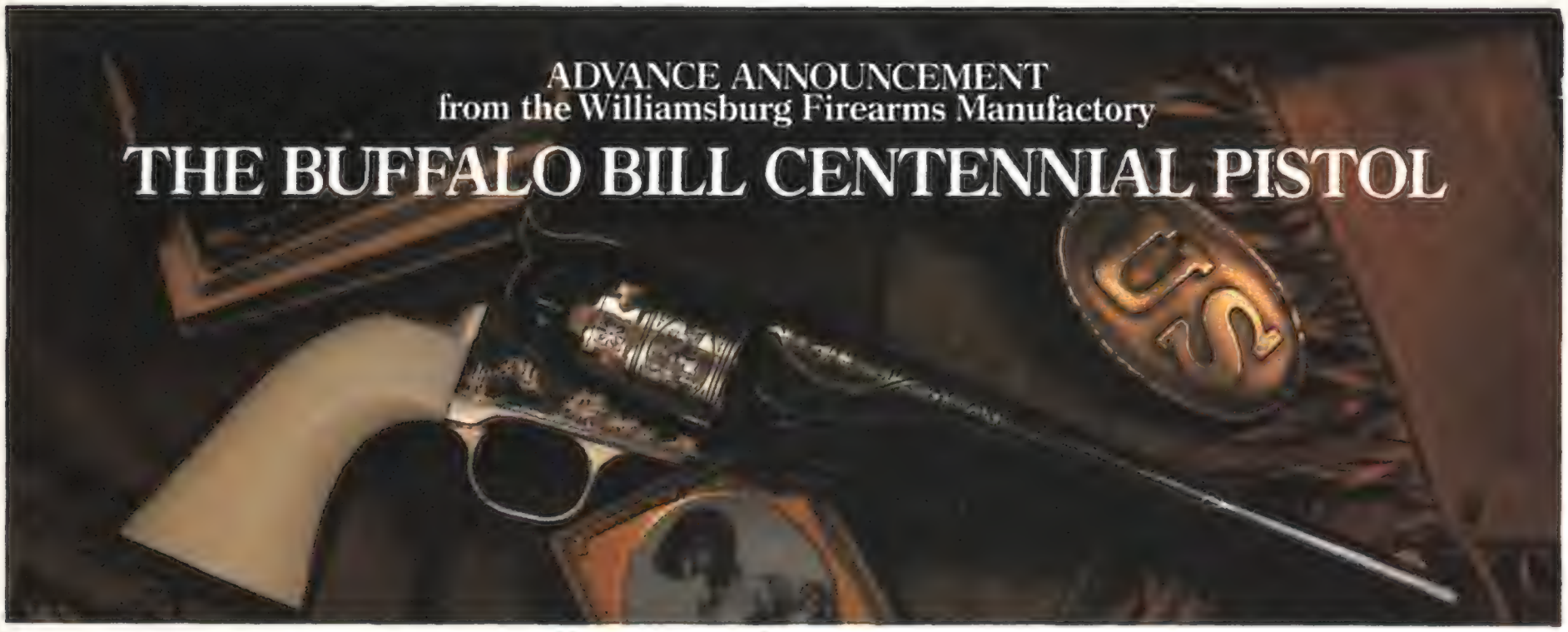
The Discovery Room is ten years old this year, which is older than a great many of its enthusiastic fans. They come to visit at the rate of about 10,000 a month, and obviously give it a good review in that children's grapevine that passes the word, lightning-fast, about what's "in": Legos, the Cabbage Patch doll, the toy truck called Big Foot, Princess Leia and whatever else has come along since this particular deadline. The Discovery Room has become, I am told, the second most asked-for place in the museum. Right after the rest rooms.

One way to reach the Discovery Room is to follow a stream of purposeful youngsters who obviously know where they're going. A couple of docents at the doorway make themselves available for guidance, but a lot of the young people are veteran visitors—and newcomers, of course, *pretend* that they're old-timers and assume an air of equal confidence.

The docents have learned, however, that the young visitors generally give themselves away when they face the array of touchables in the room. The veterans go straight to a certain drawer or box or shelf and begin examining bones or shells or stones, apparently picking up where they left off last time. The greenhorns, however, can't get past the anaconda at the entrance, either giving it a good touch or a wide berth, depending on how they feel about snakes. Then the boys usually make for the head of either a crocodile or an alligator (you're supposed to figure out which it is—I had to ask) and test the sharpness of the teeth, while the girls are enraptured by the costume corner and, like my young friend, may start undressing with alarming speed.

The Discovery Room was founded in 1974 by a couple of museum people who felt that visitors would benefit from being allowed to touch and even play with certain exhibits. It was an instant hit, was renovated after a few years and now is so popular that days must be set aside for school groups and certain hours for families. I stopped by at family time and found parents fully sharing the interest that their kids showed. One family, I was told, spent a day in the room taking copious notes on everything. It turned out they were planning to set up a similar discovery room in their own neighborhood. And that's what the Smithsonian is all about.

Edwards Park



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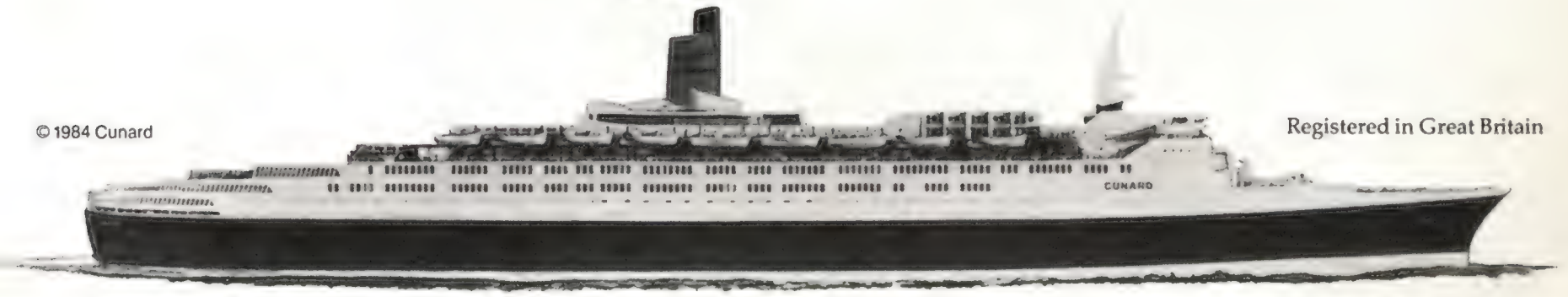

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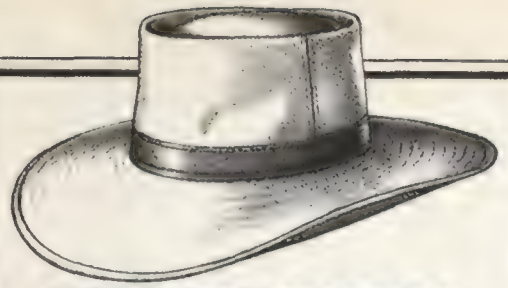

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Phenomena, comment and notes

We are only beginning to understand how much like us some animals are and to think about the implications

All my life I have been inordinately fond of dogs. I like them around the house, not only by the fire but on the bed. There was even a time when an extra chair—though not a place—was set at the supper table for a particularly special dog. Most of all, I like to play with them, wrestling on the ground or running and hiding. And there is no doubt in my mind that *they* are playing, too.

That special dog used to play a trick on me. We frequently walked in the woods, and he would run from scent to scent, working farther away from me until I could not see him or hear him running in the leaves. When it was time to go, he might have been gone for an hour or two. I would call and whistle—and hear nothing. So out of the woods I went, and up through the abandoned fields toward the house. Invariably, just as I stepped out of the brush into the backyard, he would come racing up the hill behind me at top speed, skid to a halt ten feet in front of me and look back over his shoulder, panting. I always thought he was laughing.

Sentimental anthropomorphism—perhaps. A scientist or a philosopher once would have dismissed my suspicion as nonsense. And I would have respectfully kept quiet about the whole thing, except to mutter in Galilean fashion, "But he *laughed*." How could I prove that this wordless beast had a sense of humor?

Now some philosophers, working out the morality of the relations between humans and animals, are turning the question around. One is Mary Midgley (SMITHSONIAN, February 1982), whose new book, *Animals and Why They Matter*, has just been published by the University of Georgia Press. She would put the bur-

Young rabbits nurse at the side of a Doberman pinscher, a kind of "adoption" that has been documented in the wild as well.

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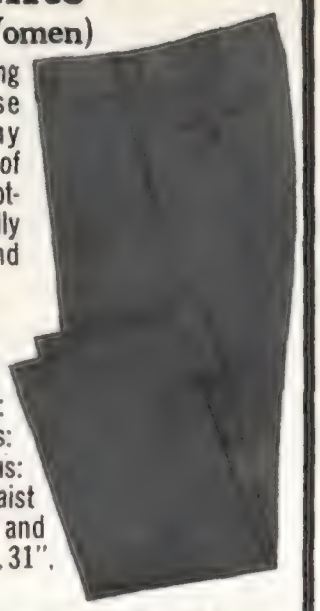

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den of proof on those who would deny the existence of subjective states in animals: "Granted the similarities between nervous systems, and also between many of the ways in which animals interact and the ways in which humans do, and granted also that humans often interact with animals successfully, *how wide a difference in their basic social faculties does it make sense to posit?*"

Her book brings together two intellectual currents: an increased scientific understanding and public appreciation of animals, and an increasing tendency by philosophers to extend moral questions beyond the barrier of our own species.

The issues are not new. Midgley repeats the question Voltaire put to the vivisector: "You discover in it all the same organs of feeling that are in yourself. Answer me, mechanist, has nature arranged all the means of feeling in this animal so that it may not feel?" Then there is Jeremy Bentham suggesting, on the occasion of the French abolition of slavery, that all sentient creatures might someday be brought inside the moral community: "The question is not, Can they *reason*? nor Can they *talk*? but Can they *suffer*?"

The recent appearance of books with titles like *The Moral Status of Animals* and *Animal Rights and Human Obligations* does not necessarily mean the philosophers are living in their own little world. People, Midgley feels, are becoming aware of the new information about animals: "Some dim conception of splendours and miseries hitherto undreamt of, of the vast range of sentient life, of the richness and complexity found in even the simplest creatures, has started to penetrate even to the least imaginative."

Much of this new information comes from ethologists, the scientists who study animal behavior. They find patterns that resemble those in human life, according to Midgley, not because they "illicitly project human qualities onto animals, but because human life really does have an animal basis. . . ." We share with animals complex activities like play and maternal affection, rivalry and fear. Some animals—notably wolves, elephants, dolphins and whales—will care for sick comrades. Some will even adopt the young of another species (p. 28 and right).

Scientists work hard at avoiding anthropomorphism—literally the giving of human shape to nonhuman things—and rightly so, because taking such a stance discourages guesswork and assumptions, and encourages investigation by every possible means. The argument is that it is impossible to know objectively the subjective state of another being, especially one that cannot talk. But Midgley points out that in everyday life, we judge the subjective state of animals all the time. Even in our urban society, she says, "people rightly assess the moods of dogs, and dogs of people. . . . In the Amazonian jungle, where it really matters, they do better still." (Closer at hand—on the last page of this magazine, in fact—the mood of a suburban dog named Pamela is assessed.) The zoologists themselves, she says, after carefully including ritual disclaimers in their books, go on to describe behaviors that are the very subjective states they claim are unknowable.

She calls this dualism "doublethink" about animal consciousness, kept in place only by inertia. "There are times when psychologists, like penguins, can be seen crowding to the edge of an intellectual icefloe, hungry for the nutritious facts swimming about below, but hesitating to dive until somebody else has tried it and escaped being eaten. On such occasions several enterprising birds often seem to splash in almost simultaneously." This is happening now, she says, and words like consciousness, self-knowledge and imagination are becoming reputable again.

Having devoted nearly the entire book to removing the barriers to a concern for animals, Midgley leaves the rest up to us. We can decide to be minimalists, she writes, and care for as few things as possible. In practice, this means we consider

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everything worthless that has not been proved to be to our advantage.

We need some such approach to sort out competing claims for our limited powers, she concedes, but it can be carried too far. The hostility to religion in much Enlightenment thinking was often deserved, she argues, but was also used against a number of things of great value. "Among them has been that sense of wonder, of awe at the vastness of Nature, and of humility at our own dependent and insignificant place in it, which we need if we are to function realistically as part of the biosphere where we belong."

Even if minimalism would work for us, she continues, it is not likely to make us happy. Human beings need more. It is characteristic of humans, Midgley says, "even when they have security, to reach out beyond it, never to be satisfied, to be always curious and enterprising."

Science is a part of this reaching-out, the attempt to explore the universe. The other animal species that share our planet are an important part of that universe. "They are the group to which we belong. We are a small minority of them. It seems reasonable to suggest that we ought to take them seriously."

People often become minimalists, Midgley offers, when an inconsistency in the decisions they have made about life becomes unbearably uncomfortable. They simply abandon one or another, retreating to a less complicated world. But, she says, there is another way.

"When some portion of the biosphere is rather unpopular with the human race —a crocodile, a dandelion, a stony valley, a snowstorm, an odd-shaped flint—there are three sorts of human being who are particularly likely still to see point in it and befriend it. They are poets, scientists and children. Inside each of us, I suggest, representatives of all these groups may be found. The decision whether to go in for minimalism is the decision whether to suppress them or to take their advice. It is too large a problem for this book, and I must leave my readers to settle it."

For me, Mary Midgley is a deep-diving penguin. She is also a charmer: Who can resist the thought that somewhere inside himself is a touch of the scientist, of the poet, of the child? It may still be too soon to suggest that a dog can have a sense of humor, but I cannot help feeling that things are moving in the right direction.
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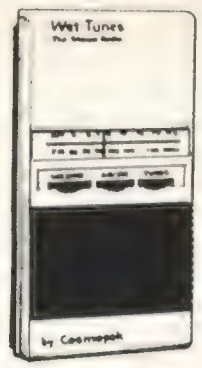

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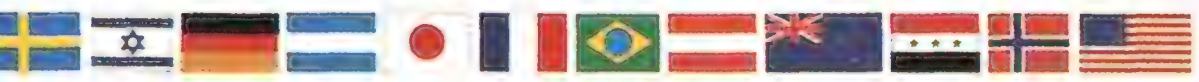

HEWLETT PACKARD

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Points of origin

From flowery medieval greensward to modern canned meadow, lawns have a history of care and complaints

In 1883 the traveling circus passed through Pulaski, Tennessee, putting on its show in one of the town's grass lots. When it departed a few days later, its only legacy to the town was a series of three great circles etched into the turf by its tents, with a curious bare spot in the center of one. Over the next 75 years, the locals would point to that spot, shake their heads and claim it was where "an acrobat fell and killed himself." In the mind of the folk, grass refuses to grow on the spot of a murder, a lynching or any violent death.

This is good news indeed if your lawn isn't quite the pride of the neighborhood, and you're casting about for an excuse. Just tell your friends about the star-crossed lovers who came to grief in your front yard. Better hurry, though, because it's that time of year again. Time for raking, fertilizing, seeding, watering, rolling and then—assuming you've done a good job—cutting. And weeding. . . .

As a nation, we seem to go at this annual task with colossal determination, and to throw mountains of natural resources at the problem—using something approaching a million *tons* of chemical fertilizer per year on our lawns to keep them green, as well as uncounted tons of lime to fix our collective soil pH. And the Water Resources Division of the U.S. Geological Survey simply throws up its hands when it comes to estimating the amount of water expended on lawns. The best they can do is note that each American citizen uses about 100 gallons of water

Städelsches Kunstinstitut, Frankfurt

Blossom-sprinkled green space of medieval cloister garden, a forerunner of lawns, appears in 15th-century *Garden of Paradise* by an unknown Rhenish painter.

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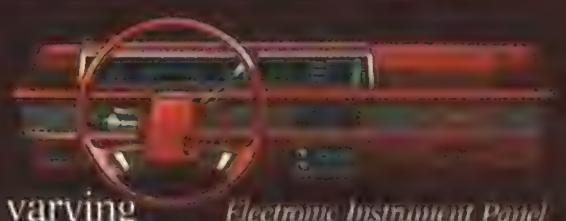

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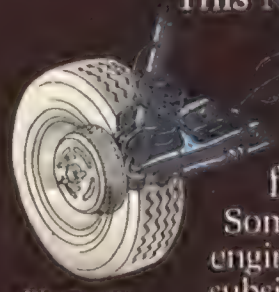

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per day around the home. Not a little of that amount, I suspect, is soaking into front yards at this moment.

Americans weren't always so ardent about their lawns. Let's face it, modern lawns are unnatural. It is reported that in the mid-1800s, when Nathaniel Hawthorne visited England—where the rage for solid-green lawns was in full cry—he was driven to distraction by the artificiality of it all. In vain he searched for a weed, a nettle, anything foreign to break the spell of unrelieved greenness.

W. H. Hudson (1841-1922), who wrote novels set in South American forests and books on the natural history of British birds, saw *true* grass. Said he: "Grass, albeit the commonest, is yet one of the most beautiful things in Nature when allowed to grow as Nature intended, or when not too carefully trimmed and brushed. Rather would I see daisies in their thousands, ground ivy, hawkweed, and even the hated plantain with tall stems, and dandelions with splendid flowers and fairy down, than the too-well-tended lawn grass."

Historically, indeed, lawns weren't always lawns as we know them. Tradition holds that ancient and classical gardens had green plots that were sprinkled with flowers, as if the gardeners had small meadows in mind. The Persians are celebrated for these flowery greenswards and their style of green interspersed with blossoms can still be seen in the design of Persian garden carpets. In the Middle Ages, lawns are often shown in illuminated manuscripts and paintings as being covered with delicate wild flowers (p. 36).

Could we be returning to this sensible viewpoint? It is comforting to note that one entrepreneur is now offering a container of seeds that promises a carpet of blossoming wild flowers from spring till fall. With or without flowers, however, our ancestors invested grass with a great deal of symbolic importance. Consider, for example, the medieval legend of Saint Begha, a seventh-century virgin who lived and died at St. Bee's Head, on England's Cumberland coast. Although she was born an Irish princess, she left that land to sail across the Irish Sea to what became her lifelong home. Begha's means of transport? A piece of green Irish sod, which she cut out, threw onto the waves and stood on for the 75-mile trip due east.

A commonplace of folklore and literature is that grass is the "beautiful uncut hair of graves," as Walt Whitman once suggested. If he were alive today Whitman would probably be delighted to learn that the Koreans prize their zoysia grass not only for its green, but also for the way it turns golden in winter. Korean tombs are simple mounds of earth overgrown with thick mats of it; royal graves there have been so covered—without fertilizer or irrigation—since the year 1200.

Recently, the USDA and the U.S. Golf Association sent a team of agronomists to the Far East to find new grasses—zoysias mainly—that could be adapted to American lawns and playing fields. "I noticed we were spending a lot of time in cemeteries taking grass samples," says the USDA's Jack Murray. "Cemeteries and golf courses—in Korea golf is a status symbol." In both East and West, it seems, our games and our graves alike are intimately associated with verdant, prolific grass.

Actually, the history of two games—bowling and golf—is intimately connected with lawns. Bowling was originally an outdoor game played on turfs so fine that subtle discontinuity in the ball's shape—called the bias—could come into play. And the bowling alley itself was a lane of turf between the trees, a vista in a landscaped park. Sir Francis Drake is said to have been bowling at Plymouth when the Spanish Armada was first sighted. Before taking the British fleet out to meet the Spaniards, he finished the game.

Golf was first played in Scotland, Holland and southeast England, anywhere that there were naturally-close turfs caused by grazing or shallow soils. Ironically, lawn tennis was not invented until the 19th century when "real" or "court" tennis, an indoor game (SMITHSONIAN, December 1982) was finally moved outdoors to be played on a chalked turf.

But you can't really blame the modern lawn on the rise of golf and bowling. You might, however, blame it all on Edwin Budding, the man who invented the lawn mower in 1830. Budding, a clever foreman in an English textile plant, saw how the machine for cutting the nap off cloth could be transformed into one that would cut lawns. Said he at the time: "Country gentlemen will find in using my machine an amusing, useful and healthful exercise." Has there ever been a crystal ball so wildly out of whack?

Michael Olmert

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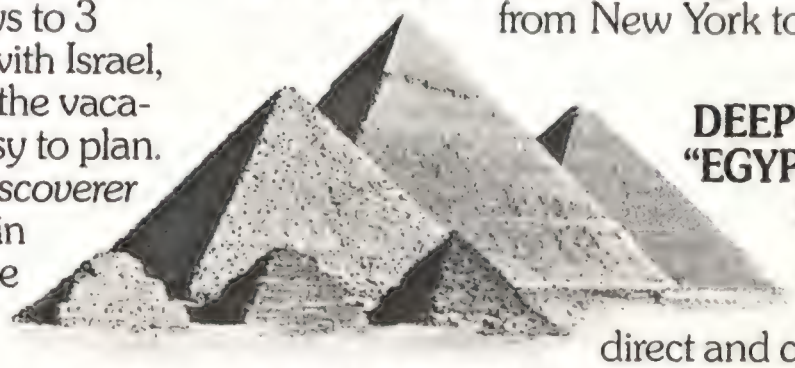

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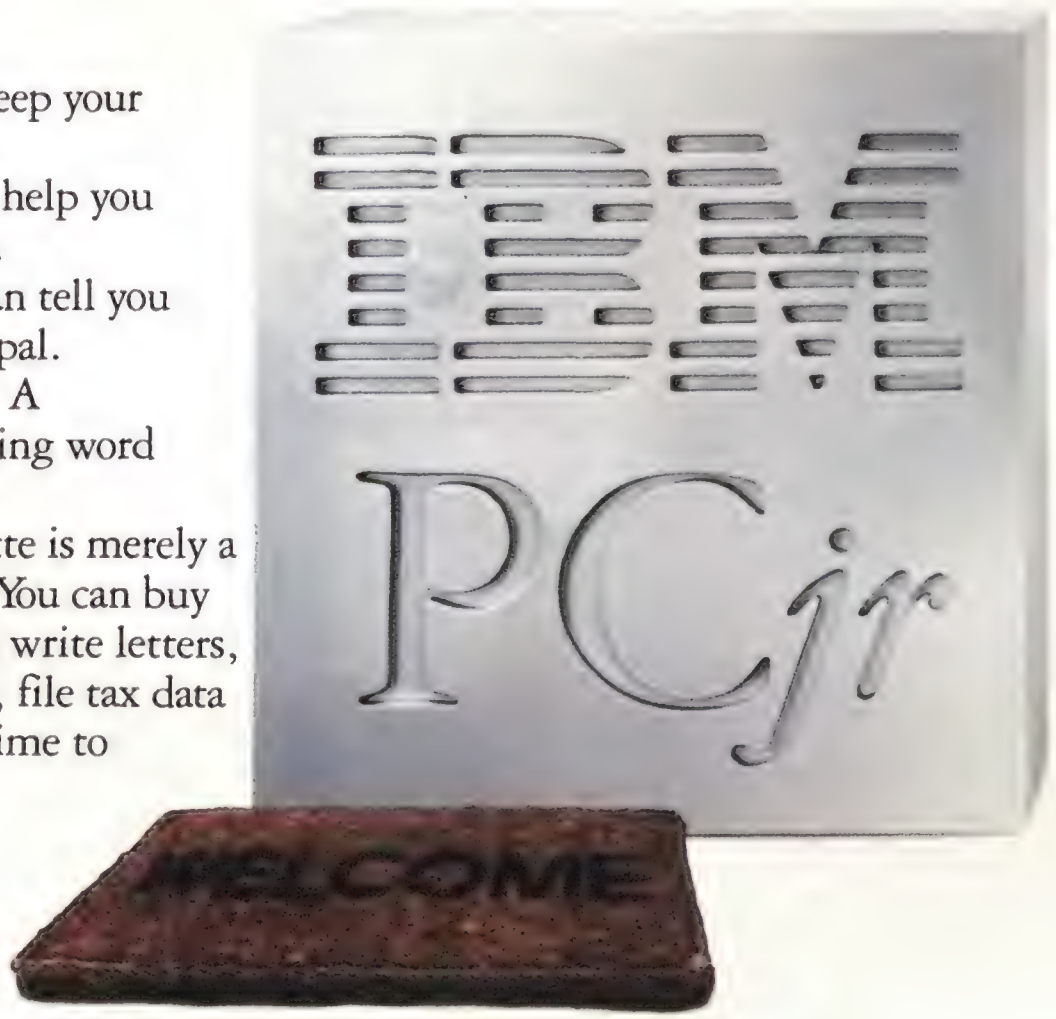


By Paul Trachtman

The search for life's origins—and a first 'synthetic cell'

Scientists use precursors of genes and enzymes to learn how life evolved four billion years ago; they hope to repeat the process in the lab

In David White's chemistry laboratory at the NASA-Ames Research Center in Mountain View, California, there are no spectacular electric sparks or lightning flashes, no bubbling cauldrons or vaporous clouds rising from the racks of test tubes. "My experiments involve fairly boring test tubes with a little bit of dried-out clay in the bottom," White says. What is going on inside those test tubes, however, could turn out to be among the most exciting chemical interactions in the past four billion years. White is one of a small group of chemists, biologists, physicists, geologists and other scientists who are edging closer to a reenactment of the basic chemical events leading to what could be called "the origin of life."

These scientists, who now command the technology to peer into the minute molecular structure of cells and to gather data from the atmospheres of remote planets, are using their new knowledge of both the cosmos and the cell to re-create the scene on Earth, about four billion years ago, when life first arose from its chemical constituents. Their research is stripping away biology's most ancient mysteries, but its most extraordinary implications lie in the future. For, if scientists can repeat in the microcosm of the test tube the chemical processes by which nature first brought forth life, they will have found the recipe that allows them to make synthetic life for the first time.

While the recipe is not yet clear, the main ingredients amount to only a short list: nucleic acids, proteins and lipids. These provide the cell with its basic necessities: "information molecules" that carry its genetic code, "enzyme molecules" that keep its chemical reactions going, and "membrane molecules" that determine what flows in and out of the cell.

Nucleic acids (the DNA and RNA of the genetic code) are generally regarded as information molecules, while proteins provide the enzymes and lipids the membranes. In nature, genes and enzymes are very large, complex molecules, assembled in the cell from smaller precursors—nucleic acids from nucleotides, proteins from amino acids. In the laboratory, scientists can't yet synthesize complete genes and enzymes, but they have made a start by synthesizing intermediate molecules from the small precursors.

In the past few decades, researchers have demonstrated clearly that the necessary building blocks of the cell, including amino acids and nucleotides, can be made out of simple, ordinary compounds found in any chemistry lab and likely to have been present on the ancient Earth. Now, as their research goes beyond the building blocks, scientists are trying to demonstrate how the basic components could have evolved and organized themselves into the first cell. They are trying to show how, before there was life, molecules could have made copies of themselves through a primitive kind of reproduction, grown more complex and evolved through accidental errors like mutations—and also how conditions in their environment could have enforced a kind of "natural selection" to direct their evolution toward life.

In David White's test tubes small precursors of pro-

David White uses bits of this clay, like that on ancient beaches, in research simulating pre-life chemistry.

Primordial seascape with volcanoes, meteors, impact craters is a setting where life perhaps had watery start.

teins and nucleic acids are gently heated and dried out on a clay surface for up to a month; then the products of any chemical reactions that may have occurred are analyzed. In the new molecules that may be formed, White is looking for evidence to support, or disprove, his theory of how life first arose. He has proposed that living systems were formed far more rapidly on the primitive Earth than most scientists have supposed, and from much simpler compounds than are usually thought to be necessary.

To test his theory, White is searching for the simplest combination of chemicals that would include both an information molecule and a primitive enzyme, thus providing a prototype of the living cell's chemistry. But White is experimenting with molecules so small and simple that they have seemed outside the realm of biology. "To use an analogy," White explains, "if the simplest living cell has the amount of information of the collected works of Shakespeare, we are talking about a couple of short words like cat and dog, and maybe one of them is misspelled."

Scattered around the country are other laboratories like David White's. At Columbia University's medical center in New York City, Donald Mills and Fred Kramer watch short RNA strands "reproduce" and "evolve" in solutions where one kind of enzyme assists their synthesis while another preys on them by chewing them up—resulting in a kind of molecular natural selection. At Cornell University's Department of Chemistry, David Usher is trying to simulate conditions in ancient tide pools where the simple molecules that make up RNA would have been subjected to repeated cycles of dry hot days and cold wet nights, a process he thinks could have provided both the energy for chemical evolution and another sort of natural selection, favoring some chemical bonds over others.

At the Salk Institute in La Jolla, California, Leslie

Paul Trachtman, a member of the Board of Editors, wrote on children "without language," February 1984.

Artist's conception is based on new studies of planets as well as Earth's atmosphere, oceans, landmasses.

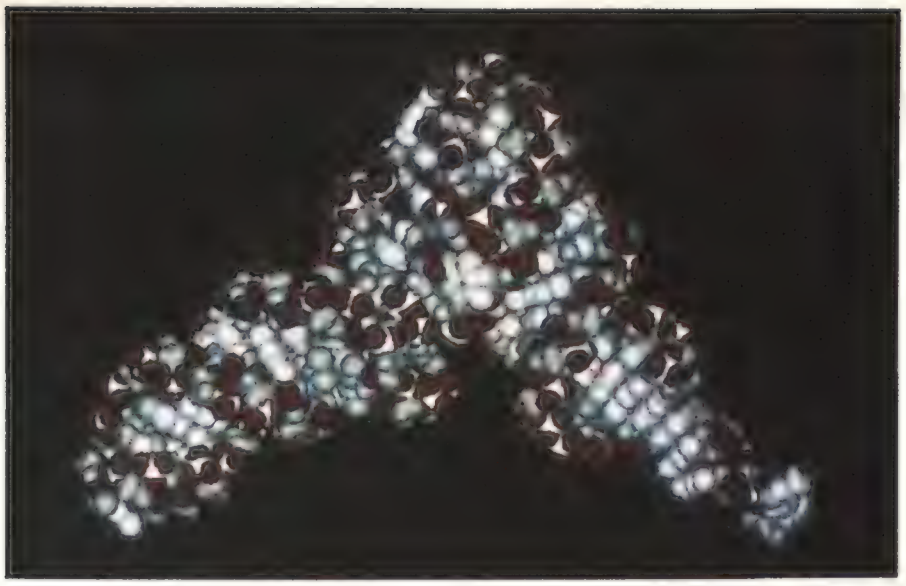
Orgel's experiments are raising expectations that RNA molecules might have been all that were needed to begin a process of replication and evolution that led to life. Still another image of life's origins comes from David Deamer's laboratory at the University of California's Davis campus. In Deamer's experiments, using fluctuating "tide pool" conditions, the kinds of molecules that make up cell membranes, called lipids, assemble themselves from simple precursors (p. 50). Then, when the membrane molecules are dried out and flushed again in the company of large molecules of DNA, the lipids engulf and capture the DNA in primitive cellular structures.

"This is as far as we have gotten toward producing a cell-like system under plausible prebiotic conditions," Deamer says. "It shows that big molecules could be encapsulated, very simply. It just takes one incoming tide, one drying cycle, and then the next tide washes away these 'cells.' So it must have been happening. It's just too simple not to have happened."

Only in the past few years have experiments such as these become practical. "We couldn't begin to think about the original processes," says Deamer, "without advances in understanding membranes, nucleic acids and proteins in contemporary cells."

That understanding points up the extraordinary nature of living cells. University of Iowa biochemist William Day, author of a comprehensive new text, *Genesis on Planet Earth*, points out that even the simplest bacterium has 2,000 to 3,000 different enzymes, and the activity of these enzyme molecules is almost beyond imagining: a single enzyme molecule can typically participate in chemical reactions with more than 500,000 other molecules per minute.

It is the increasing ability of scientists to measure and manipulate these basic molecules in the laboratory that is producing a new wave of experiments, and theories about the origin of life. "It's nice that so many people are starting to do real experiments," says David Usher. "There's been so much hypothesis and



Model of RNA represents an "information molecule" that some theorists believe was the first form of life.

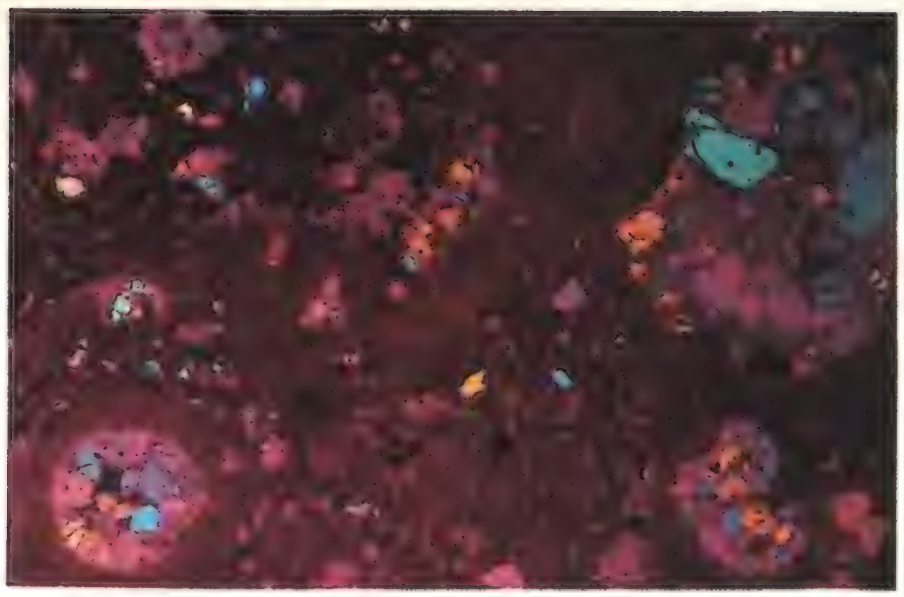
A spaceship, in Francis Crick's theory, landed in ancient oceans, releasing first microorganism on Earth.

philosophy surrounding this entire field of science."

The Russian biochemist Alexander Oparin laid the basis for these experiments in 1924 with the suggestion that evolution was at work even before life began, "selecting" increasingly complex organic molecules (those containing carbon and hydrogen) with new intrinsic properties from the background of mixed organic compounds on the early Earth. Four years later, Englishman J. B. S. Haldane predicted the source of the organics. Harsh ultraviolet light would have energized the gases in Earth's first atmosphere, he said, causing organic molecules to form and collect in the oceans like a massive primordial broth—a chemical soup from which life would emerge.

Reconstructing a picture of life's earliest habitat has been a considerable challenge because crucial evidence has been entirely erased. The mystery is what happened on Earth *between* 4.6 billion years ago, when our planet formed from a vast cloud of gas and dust, and 3.8 billion years ago, the age of the oldest terrestrial rocks. The geological evidence has vanished, leaving what British geologist Stephen Moorbath calls "an embarrassing little gap of more than 700 million years." Significantly, it was toward the end of this enormous blank period that the very first inhabitants, single-celled and microscopic, probably emerged. Paleontologists have found traces of primitive algae and bacteria in rocks, from a lonely outpost in western Australia, dated at 3.5 billion years (p. 48). Considerably simpler organisms must have preceded them, according to the current consensus in the field.

Clearly, it is necessary to fill in the "embarrassing little gap." And, to a surprising extent, scientists have reconstructed a dramatic picture of life's first habitat based on data from other planets, and on back extrapolations from information about today's atmosphere, oceans and landmasses.



Slice of Murchison meteorite (seen with microscope) supposedly carried nucleic-acid precursors from space.

Four billion years ago, the Earth was a study in black and blue. Within the first 600 or 700 million years after the planet coalesced from the solar nebula, a black rocky "skin" appeared and started to thicken. This original crust, speculates Stephen Moorbath, was covered in most places by a blue ocean. All over the globe, dark volcanic islands jutted upward and strong waves beat against hundreds of miles of curving black beaches, wide lava flows and rocky shorelines (pp. 44-45).

The rims of giant impact craters probably also loomed from the oceans, says planetary scientist Brian Toon of NASA-Ames Research Center. Like the moon, the Earth was heavily bombarded by massive asteroids for the first billion years or so of its history. Thus the sky, which was probably pale blue due to volcanic ash, would have been emblazoned regularly by brilliant meteors and asteroids.

The bombardment was so extensive that eventually, scientists believe, all the rocks of the initial crust would have melted in impact events. "This," says geologist Steve Squires of NASA-Ames, "would set a fundamental limit on the oldest rocks" that is several hundred million years less than the actual age of the Earth. And it gives an explanation of the mysterious gap in the geological record.

But there is much that remains uncertain about the world in which life arose. "The day was shorter about four billion years ago, but no one really agrees on how short," says David Usher, who is trying to simulate that prebiotic world. "In my experiments, I'm using somewhere between five and ten hours. And there's a fair bit of controversy, but not wildly emotional, about what the average temperature was." Usher uses current estimates from places like the Namib Desert and Death Valley, where surface temperatures range from six to 75 degrees C. "Those are fine," he says. "You can do a lot of chemistry with that."

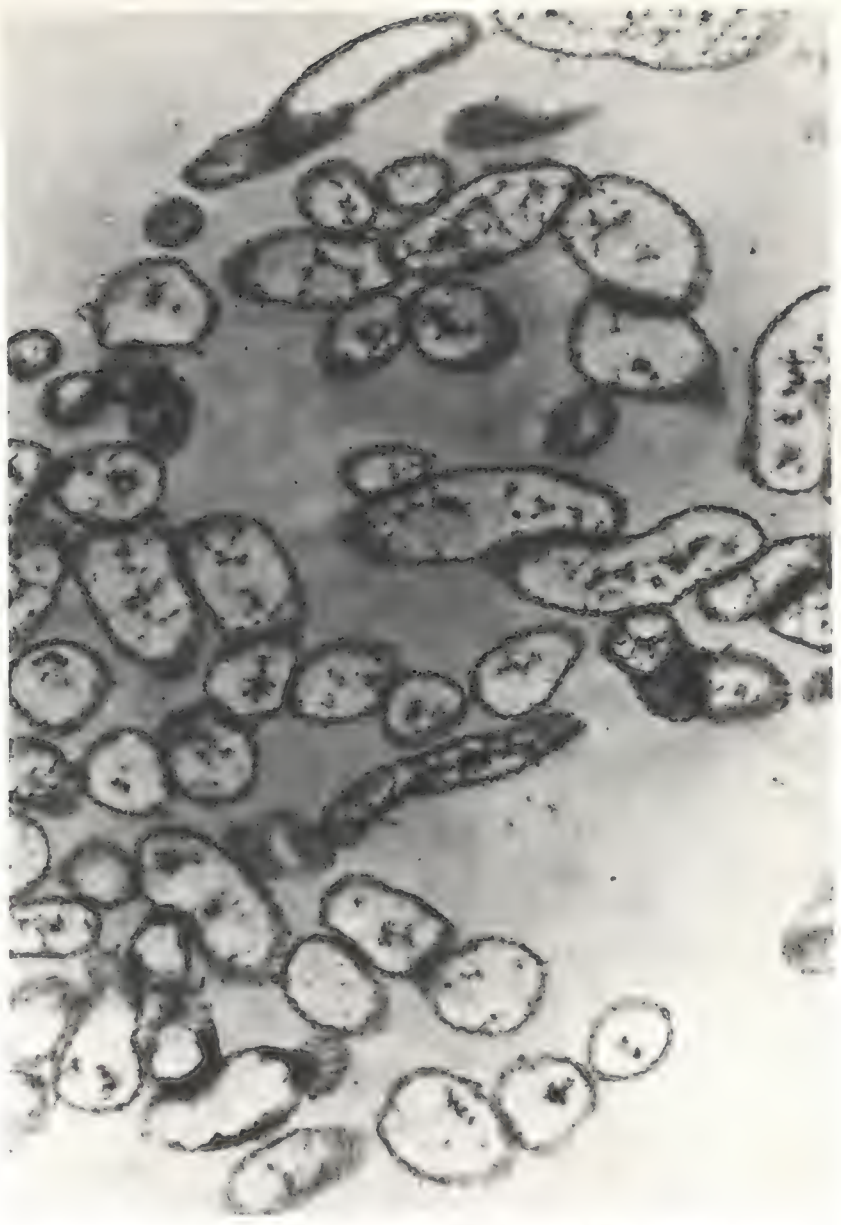
The turbulence of the setting, while it may have erased any record of the first organisms, may also have been a significant contributor to their emergence. There is a growing consensus that fluctuating environments with cycles of wet and dry, hot and cold, were needed for the kind of chemical evolution that could lead to life. "At every beach these natural experiments were going on," Deamer surmises, "where dilute components were washed into tide pools and dried out, allowing the simple sorts of chemistry that cause small molecules to become big molecules, until one of these suddenly found a way to replicate itself. That probably occurred at many places, and we don't necessarily have to think of one molecule starting up at one place and beginning this whole process."

One of the most hotly debated questions about this primitive environment has been the composition of the atmosphere, which would have determined the kinds of molecules available for those first "natural experiments." The early biochemists, including Oparin and Haldane, had assumed an atmosphere lacking oxygen but rich in the original gases of the solar system: methane, ammonia and hydrogen. This mixture was the basis of a historic experiment, carried out in Harold Urey's laboratory at the University of Chicago in 1953, which resolved a paradox that had stymied previous students of life's origins.

Life's precursors in a spark chamber

The problem was that the kinds of organic molecules essential to life could not be synthesized from the inorganic molecules of the nonliving world. But if only living cells could make the organic compounds needed to create life, how could the process ever have gotten started? A student of Urey's, Stanley Miller, designed an apparatus to test his professor's conviction that in the Earth's original atmosphere, organic compounds could have formed before there was any life. Its upper chamber was filled with the gases thought to represent the ancient atmosphere, and a lower flask was filled with water to simulate the oceans. The scientists shot sparks through the system for a week to simulate lightning, while heating the water so that it would evaporate and rain down again in repeated cycles. Soon their in-vitro ocean was brimming with organic compounds—including amino acids, the precursors of proteins.

This experiment, carried out in the same year that Watson and Crick deciphered the genetic code of DNA's double helix, and Frederick Sanger first figured out the basic structure of a protein molecule, opened a new era of experimentation as one laboratory after another now demonstrated the synthesis of life's basic molecules. Cyril Ponnamperuma at the University of

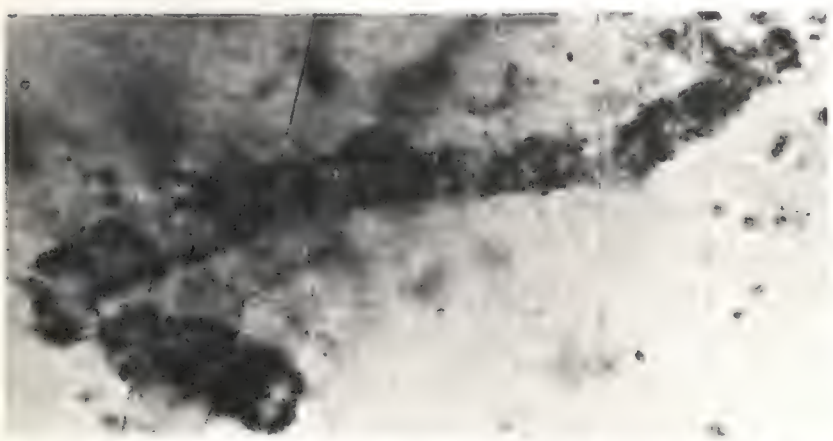


Bacteria isolated from deep-sea "smoker" (opposite) in East Pacific were grown in lab at 107 degrees C.

Maryland and Joan Oró at the University of Houston showed how precursors of nucleic acids could have formed under primitive conditions, while Sidney Fox at the University of Miami showed how amino acids could be combined into more complex molecules, and could form proteinlike spheres which he called "protocells." More recently, Oró and Deamer have both shown how lipids in the prebiotic soup could have formed more lifelike protocells.

The first successes of these chemists were questioned by other researchers who challenged their assumptions about the atmosphere, some claiming that the Earth's original atmosphere was blown away and replaced by outgassing from the Earth's core during eons of volcanic eruptions. The proposed second atmosphere was less favorable for forming organics, but the chemists continued producing new batches of the essential organic precursors of life even from the latter mixtures of gases. Moreover, there was new evidence from outer space to support the hypothetical experiments.

In the late 1960s, astronomers detected enormous clouds of organic molecules in the spiral arms of our Galaxy. By now, more than 50 compounds have been identified, including formaldehyde and hydrogen cyanide. Molecules of the former can react to yield amino acids, and of the latter to produce the precursors of nucleic acids.



Bacteriumlike organism from western Australia, about 3.5 billion years old, is the oldest fossil of living cell.

In addition, the meteorites called carbonaceous chondrites—which splashed into the early oceans by the millions—still fall to Earth regularly, and Ponnamperuma and others have claimed that these jagged, charred-black rocks do contain a palette of biological precursors. Recently, in fact, Ponnamperuma reported finding all five of the nitrogenous bases that occur in DNA and RNA in a single rock from outer space, the Murchison meteorite (p. 47), which fell in Australia in 1969, although other workers claim that the meteorite was contaminated by organic compounds after landing on Earth.

With the wealth of biological precursors apparently well established, scientists have turned to the question of how life could have organized itself out of that

original organic soup. And here the controversies are as thick as the evidence is thin.

Some researchers have simply removed the problem to someplace else in the universe, proposing that life arrived on Earth as an interstellar microbe. Nobelist Francis Crick and Leslie Orgel of the Salk Institute proposed a spacecraft from a more advanced civilization as the vehicle (p. 46), while British astronomers Fred Hoyle and Chandra Wickramasinghe have suggested the heads of comets as life's first home.

Taking a more Earthly tack, oceanographer John Baross and colleagues at Oregon State University are looking for evidence that life first formed, and may still be forming, from organic precursors in hot ocean-bottom vents. Baross was aboard the research submarine *Alvin* in 1979 when it descended to the deep seafloor off the Gulf of California. In those black, frigid waters a mile and a half below the surface, the explorers discovered a field of hot springs inhabited by strange marine life and scattered with tall chimneys spewing jets of superheated, mineral-laden water (right). Samples taken from the heated water of these "smokers," Baross reported, revealed bacteria that can thrive at 250 degrees C or higher—cells alive in a veritable cauldron (opposite).

This astonishing claim has provoked skepticism from some of Baross' colleagues, who believe that his water samples from the depths, like many meteorites from outer space, were contaminated. But Baross maintains that these thermal bacteria may be modern counterparts of the first living cells, noting that many fossil remains of ancient microorganisms have been found in ancient marine volcanic sediments.

Baross is now constructing a complex chamber in his laboratory to simulate conditions in these natural seafloor pressure cookers, and one of his colleagues has returned to the smokers to collect more samples.

Probing the chicken-or-egg paradox

Meanwhile, a host of researchers without oceans to dive into have begun plunging into the ultimate paradox of life's origins. Even the simplest living cell needs nucleic acids in order to make its proteins, and proteins in order to make its nucleic acids. Thus, to ask whether the first cell evolved from nucleic acids or proteins is like asking Which came first, the chicken or the egg? Scientists, studying these essential components in different laboratories, have tended to divide into "nucleic acids first" and "proteins first" camps.

Recent experiments in Leslie Orgel's laboratory and elsewhere have stirred increasing interest in the RNA-first theory. With a short strand of RNA (p. 46) and a mixture of simple molecules that serve as letters in its code, Orgel has shown that the strand can "instruct"

In hot murky jet of East Pacific "smoker," one theorist sees habitat for life's origin in the past—and now.

In Deamer's lab, membranous lipid molecules engulf DNA in "protocells" (top) and then extend on filament stalks (bottom). Dark spheres are devoid of DNA.

the proper molecules to pair up with it in a double helix, even without any enzyme present. However, Orgel has not figured out how to separate the paired strand into new copies, as would be necessary to demonstrate self-replication. "Only *cells* are capable of replicating themselves," observes Queens College biologist Barry Commoner, a critic of both theoretical camps. "If something is self-replicating, it's got to be able to do it by itself, with no clever biochemist standing on the sidelines helping it along."

Confronted by the chicken-or-egg paradox, some scientists are trying to look at the process of life's origins in new ways, seeing the cell as something more than the sum of its parts. The paradox, they suggest, does not really exist in nature but rather in the scientists' way of explaining life.

It is not easy to explain what is going on here, but a metaphor may help. One theorist, Chilean neurobiologist Humberto Maturana, uses the analogy of an automobile. To understand what a car is, and how it runs, it is useful to know about all of the basic components such as cylinders and spark plugs, gears and wheels. But if these are laid out on the floor, one still has no idea of what a car is—until the parts are connected and the vehicle begins to move. Researchers on the origins of life are at the stage where they are shifting from asking What are the parts? to How are they organized to function as cells? The difference between a car and a cell, Maturana points out, is that a car keeps going by cyclic changes in the *positions* of its parts, while a cell keeps going by cyclic changes in the *productions* of its own parts.

New ways of thinking, and new words

"There are whole areas in ferment now," says David Deamer, "because not only are we trying to find new ways of thinking about the phenomenon, but new words to describe it."

Manfred Eigen in Germany, Maturana in Chile and David White in California are three of those who have drawn up blueprints for a system that involves a "feedback loop" or cyclic relationship between nucleic acids and proteins. Eigen has described his system in terms of synchronized "hypercycles" involving both proteins and nucleic acids—"neither one could precede the other," he says; "they had to evolve together." Maturana has coined the term "autopoiesis" (from the Greek for self-producing) to define a system in which "the various kinds of molecules that make up the cell participate in producing the same kinds of molecules." And David White, working with his "cat" and "dog" molecular components, has developed a similar concept he calls the "autogen."

"The idea of autopoiesis has direct consequences for

the laboratory," says Lynn Margulis at Boston University, a leading researcher on cell evolution whose own work has been guided by the concept. "It means that looking at nucleic-acid replication by itself does not necessarily lead to self-*maintaining* systems." David White has equally practical concerns. "The autogen theory has one purpose above all else, to suggest what is worth doing in the laboratory," he says.

In his test tubes, White has found molecules made of only two amino acids that act like a primitive enzyme, and he is trying to understand how the information of nucleic acids is translated into the amino-acid language of the proteins. In its simplest terms, his autogen would be a system in which information molecules direct the production of enzyme molecules they need to make more copies of themselves.

This new direction may bring science closer to an explanation of life's origins—or it may make clearer how far there is yet to go. "What is occurring now is the interplay between the sorts of questions we have been asking," says David Deamer. "What were the mechanisms that permitted the first replicating systems and the first catalytic systems to talk to each other, and to get together in a cyclic process?" Deamer's own research adds yet another level of complexity, looking at nucleic acids and membranes together.

"It may be that just working with nucleic acids, or proteins or lipids is not enough," agrees David Usher. "Probably the real advance is going to come from someone who is brave enough to put those three together at the same time. But that is *horribly* complex to investigate. Especially for someone who has been trained to investigate the details of a mechanism, it's very difficult to suddenly say, 'Well, I'm going to throw all these things in, and we don't know quite what's happening, but it might produce something interesting. Then we'll go in and look at what happened.' It's so complicated that to do anything experimental at this level is a real challenge."

How great a challenge was made clear by the pioneering biochemist J. B. S. Haldane when he turned to his colleagues at an origins-of-life conference 20 years ago and predicted that "some of us, or of the next generation, will try to make a living organism." Was Haldane too optimistic in his prediction? "I wouldn't be too sure," Usher says.

Deamer reflects on model of one of lipid molecules he uses to produce the protocells on the opposite page. Mixed with water, this molecule tends to assemble itself into the kind of membrane structure cells need.

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GTE

By David Littlejohn

The wild, wondrous imagination of Charles W. Moore

From the New Orleans Exposition to houses full of surprises, this architect breaks all the rules to build humane environments

The big man—six-foot-two, more than 200 pounds—ambles to the lectern looking like a tall, awkward, slightly scruffy banker. Hundreds of people have crowded into the hall to hear one of the world's most famous architects. He talks without notes, except for a few scribbles on an envelope written on the airplane coming in. Once he is under way, he lets the slides (drawn from his private collection of 50,000) direct his remarks. His treble, halting voice is distinctly non-dynamic. For a while he rambles aimlessly, leaving his fans at first baffled and disappointed.

But gradually he begins to match wild and wonderful images to great eccentric wheels of thought. Charles Moore cannot (or will not) assert or declaim, so his presentations inevitably start out seeming oblique, indirect, even apologetic. Because he appears to be such a hapless public performer, the sharp jabs and radical enthusiasms come (when they come) with all the greater force.

What he is promoting is a liberating, rule-defiant openness of vision, which he defends and demonstrates with slides and analyses of his favorite exotic places,

Model shows section of Moore's amazing 2,300-foot Wonderwall architectural fantasy for New Orleans fair.

Arcadias and Edens of every shape and size—Beverly Hills and Bomarzo and the Brighton Pavilion, Hadrian's Villa, mansard-roofed house trailers, Disneyland, the Villa d'Este—and a few that he himself has designed—his faculty club at Santa Barbara and his crazy contributions to the 1984 Louisiana World Exposition at New Orleans. He flashes on fairylands and troll lands, toy towns, ruins, follies, Texas breweries and Cape Cod barns, neon-lit streets, the water gardens of the Mughal emperors. He is trying to seduce his listeners out of the fashionable idioms and accepted canons of "good taste": out of a blind acceptance of parking lots and Savings and Loans, back to the open spaces of the free imagination—"the distant, fantastic realm of things where breezes blow from the Infinite."

By the time the lecture is over, the image of the giant, stuttering clown has melted in the heat of his eloquence and convictions. The wit and the foolery, the apparent aimlessness and outrageousness have all contributed to make his case for a more humane and imaginative world.

From 1940 to 1965, when a great deal of the urban

Detail of Wonderwall features neoclassic fiberglass "bust" made by local builder of Mardi Gras floats.

The wall, built of prefabricated modules of sheet metal, wire mesh and foam, includes exhibits, kiosks.

The interior of a unit in influential Sea Ranch Condominium, north of San Francisco, designed by Moore firm of MLTW, built in 1965, shows original use of space, color. Bath and loft are above kitchen.

and suburban world we know was built or rebuilt, the ideas and designs of the world's most celebrated architects were dominated by what critics and historians now call Modernism. Modernism, in this sense, meant a rejection of historical period ornament and detail (frequently of *all* ornament); a style of simple, flat or sparely geometrical forms; a preference for new or factory-made materials (steel, concrete, glass, plastic); and the color white. Its advocates were willing to abandon many traditional elements of design—picturesque landscaping, formal symmetry, the closed-box room, normal doors and windows—in the interests of a more liberated design, and the abstract play of line and form in space.

In its earlier days (from, say, 1919 to 1939), modern architecture seemed to its defenders a necessary part of the world's coming of age. They saw it as an essential element in our emancipation from oppressive prewar ways, just as airplanes, highways and servant-displacing machinery were said to be.

Half a century later, modern forms, materials and building methods are so in-wrought with economic forces that most large buildings continue to be designed in this style. Whether people like them or not, most new buildings larger than single-family houses and small businesses continue to look Modern in the architectural sense of the word: flat-topped, flat-sided and undecorated, minimalist, functionally efficient, probably built of reinforced concrete or steel and glass.

Sometime in the 1960s, however, Modernism both as a style and as a moral ideal began to lose its dominion over the hands of many architects and the minds of their observers. Critics began to point fingers at its more and more frequent failures: esthetic failures, human and social failures, even economic failures. By the 1970s, some writers began to claim that the entire Modern movement was a failure, a crime against Man.

Rural house near New York City, designed by Moore and Richard B. Oliver in 1973, has stepped windows.

Pyramids, prisms, pianos and whales

Since the clean, machined white wall of the International Style began to crack about 20 years ago, architects have run in many different directions in their search for new solutions. Critics, lost without their labels, have taken to calling the chaotic new scene Post-Modernist. But that term communicates nothing except what it is not, or what it came after. Post-Modern has come to mean almost anything goes.

In the same cities that erect gigantic, blank-walled concrete bunkers and tombs, mirror-sheathed office buildings and hotels rise in the shapes of pyramids, tents, clustered cylinders, trapezoidal prisms, black pianos and blue whales. Buildings are turned inside out, with floors and walls hung from nude exterior skeletons. Heating, water, sewage and ventilation pipes are defiantly exposed and painted bright colors. Gardens are planted on the roofs of underground buildings; gardens are planted in the glazed cores of buildings overground. Windows are round or triangular or Palladian-arched. Vast atria and *gallerie*, winter gardens and radio-evangelists' cathedrals are enclosed in crystalline prisms made of thousands of panes of glass. Avant-garde architects of the 1980s proudly design almost exact imitations of 18th- and 19th-century structures, as well as false-front historicist stage sets that "allude" to Versailles or Rome's Villa Giulia. Others design works that contain bits and pieces from all periods of architecture—columns and colonnades, arches and arcades, dormers, domes, pediments, porticoes—deformed and disposed in whimsical ways.

Many reasons have been cited for the defections from the orthodoxy of the first half of the century over the past 20 years. Three of the most frequently mentioned involve individual architects. The first is Louis I. Kahn (SMITHSONIAN, July 1979), a respected renegade architect whose work in the 1950s and early 1960s (he died in 1974) looked "modern" enough to many people at the time, but who is now seen as someone metaphysically alien to the International Style, and the grandfather of many Post-Modern forms.

The second is Robert Venturi, who has become much more famous for his words than for his designs. His book, *Complexity and Contradiction in Architecture* (1966), was hailed by art historian Vincent Scully as "probably the most important writing on the making of architecture since Le Corbusier's *Vers un Architecture*, of 1923"—the classic Modernist manifesto.

The third is Charles W. Moore, from 1961 to 1965 the senior partner in a small Berkeley firm called MLTW (Moore, Lyndon, Turnbull, Whitaker). During those years, he and his partners designed a few strange houses and vacation cabins—and one famous condominium cluster (p. 56)—that had an astonishing effect on American design.

I think that a strong case could be made that the writings and teaching of Charles Moore, and the design projects in which he has been involved, have formed the single most important positive influence in shaping new attitudes toward architectural design in this country during the past 20 years. I do not think there has been an American-born architect of comparable influence since Frank Lloyd Wright.

The Sea Ranch Condominium north of San Francisco, designed by MLTW in 1963 and completed in 1965, became the most written-about, most influential American building of its decade. Kresge College in Santa Cruz, California, completed in 1974, and the Piazza d'Italia (p. 61) in New Orleans, completed in 1978, each had a similar revolutionary effect—and these are three very different designs. Major projects of Moore's now under way—the Beverly Hills Civic Center, the Tegel Harbor project in Berlin, his contributions to the 1984 New Orleans Exposition—are likely to continue this story.

Unconventional peripatetic parents

Through the 1970s, Moore attracted more attention in the American professional design press than any other architect. After teaching at Princeton, he served as the head of the architecture schools at Berkeley, Yale and UCLA. In more than 100 completed building projects (most of them houses), Moore has rarely repeated himself. In almost every one, he has introduced some new form or idea.

It began, he thinks, with his unconventional parents, who lived in Battle Creek, Michigan (Charles was born near there in 1925), but traveled from it as often as they could. They drove across the country the year they were married. From then on, they made annual auto trips in a high-roofed Franklin to Florida or California. Except for two years during the Depression, these family trips continued until Charles finished high school. One could argue that they were the single most significant influence on his later life and work.

The Rodes House in Los Angeles was designed for a professor who was seeking both elegance and utility.

"From the time I was maybe 12, I got to plan our route," Moore recalls. "I'd go down to the automobile club and get sheaves of maps and tour books, and decide whether we wanted to drive to Florida this year by way of Orvington, Kentucky, or Knoxville or wherever, and then work out exactly where we were going to stay and make hotel reservations. I got very fond of middle-size cities.

"By the time I got to architecture school I had a well-built-in sense that cities, the way they were constituted, were very interesting places and that I enjoyed going to see them. I was a full-fledged tourist—had been for a long time. Seeing things that were special and unique—going to the Palmer House in Chicago for a couple of days' outing in the summer, for example—that was all built into me, a part of my urban and rural experience. I never understood the modern revolutionary notion that it all had to be swept clean, that we had to tear it down. I *liked* what was there. Especially places that were very different from one another. The first time I went to Yuma, Arizona, and found out it had wooden sidewalks—I thought that was heaven."

Moore began studying architecture at the University of Michigan at 16. He then worked in San Francisco for two years, absorbing the congenial, elegantly casual ideals of the Bay Region School. During a traveling fellowship to Europe and Egypt in 1949-50, Moore took movies and slides of the old places he loved, and began the obsessive international traveling that has shaped his life (and his buildings) ever since.

He next worked for three years teaching at the University of Utah. When his Army reserve unit was called up, he spent ten crucial months serving in Korea (and

This view is of the east facade, across the oval patio. Behind French doors is spacious two-story living room.

Charles Moore works at desk in condominium home in Southern California. He, of course, designed it.

visiting Japan) and discovered a great deal that he admired in the building art of the East.

After his Army tour, Moore went to Princeton—then almost unique among major American design schools in its resistance to Modernism—to get a PhD that combined architectural history and design. There he met Louis Kahn and Robert Venturi, as well as two of his future partners and many of his future friends, in a congenial new/old environment which was to become a major seed ground of the Post-Modernist movement.

In 1959, Moore accepted an invitation to teach at the University of California, Berkeley. By 1961 he had joined forces there with William Turnbull jr. and Donlyn Lyndon, two younger friends from Princeton, and Richard Whitaker, a Berkeley graduate, in the fledgling firm of MLTW. The four began experimenting with various liberated combinations of ideas and ideals (Japanese, Mexican, Bay Region, Louis Kahn, art-historical and just plain personal), which soon led them to the Sea Ranch Condominium commission, publicity, prizes and international fame.

To many people, some of Moore's and his partners' celebrated buildings still look very odd. Their forms, materials, details and colors are often unexpected, and hence surprising. But except for a few fantasy projects (like the designs for the Louisiana World Exposition), works whose very purpose is to dazzle or amuse, none of the buildings designed by Charles Moore and his partners was intended to be a piece of "look at me" art. If they end up looking strange or surprising—and they often do—it is because other, nonformal considerations led to that result, or because many people are still unused to so open an approach to design. The model of an Italian hill town or an old barn with its attached sheds is more satisfying to Moore than that of a single admirable object self-consciously and primarily shaped to please or excite the eye.

In his eyes, one problem with architecture seen as art is that it tends to begin with a form—perhaps a beautiful form—and then imposes that form on human users, who unfortunately come in all shapes and sizes. As Moore sees it, this is the way a great deal of modern architecture has proceeded, from Levittown (and suburbia generally) to Le Corbusier's plan for rebuilding Paris and its thousands of tower-block apartment descendants. He rails against the Cartesian tyranny of "buildings arbitrarily aligned by the T square."

After visiting and talking to the residents of almost a hundred Charles Moore buildings—and, wherever possible, "living" in them—I've come to a fresh understanding of some deeper-lying human needs and the ways in which an architect of genius can interpret and satisfy them. I've tried to catalog the things *I* admire

David Littlejohn, novelist and academician, wrote Architect: The Life and Work of Charles W. Moore, *just published by Holt, Rinehart and Winston.*

Inspired by Palladio, innovative guest residence is at Cold Spring Harbor Laboratory, Long Island.

most in Moore's work—the things I see as his unique contribution to the confused architecture of our time.

Moore has demonstrated that punched-out holes in solid walls, whether glazed or open, can go more places and do more things than anyone before in the history of architecture ever imagined. He has embarked upon a wide-open exploration of the sensory and emotional potentials of skylights and light traps, view frames, light-washed walls, magical space enlargers, dappled and reflected light—plus the sheer joy of peeking through holes, and the wonderful negative shapes that cutout spaces can make.

He has exploited the exhilarating effects of internal vertical space—whether in shaftlike ascents or great downhill dramatic slopes.

As a young boy, Moore built a multileveled waterfall near his parents' home. His doctoral dissertation at Princeton dealt with water in architecture. A great deal of his work—and much of our pleasure in it—depends on the presence of living water.

Moore's tendency toward sheer sybaritic sensual indulgence is uncommon in any major architect since Frank Lloyd Wright, and is totally at odds with the icy classic puritanism of most of the Modern school. Orchestrations of exotic, perhaps even erotic, body-enhancing colors, textures, lights, positions and feelings abound in his work.

Like many "Post-Modern" architects, Moore feels compelled to make referential connections to other buildings and places, both neighbors of his own works —old barns near the Sea Ranch Condominium project, for instance—and other buildings and places in history. His quotations of Palladio in Los Angeles and Long Island, his respectful nod to an early 19th-century German master at Berlin, the Spanish Colonial fantasies he has designed for Beverly Hills and San Juan Capistrano, whole centuries of allusion compacted into the Italian piazza and the Exposition's Wonderwall (pp. 54-55) in New Orleans—all seem to make present sense.

Another insight or specialty of Moore's involves staircases. He obviously loves the gravity-defying, self-enhancing, view-changing effect of an erect human body proceeding upward or downward on a magic geometric waterfall of levels. No other living architect is quite such a virtuoso of stairs.

On the whole, Moore's understanding of the elemental, most universal emotional needs of human beings seems to me more sensitive and refined than that of any other practitioner. He appears to be profoundly in touch with his own, and thereby *our*, instinctual cravings. He *knows* that we want to crawl under tables or hide in caves, peer down on others or into secret places; that we love the surprise of light from unknown sources; that altars and canopies and skylights and grand staircases and window seats, nooks and crannies, organized vistas, the sound of moving water all touch and transfix us in profound and prerational places. He knows, moreover, how to orchestrate and achieve these basic satisfactions in real buildings designed for real people.

By continuing to work in a manner that is at once humane and highly original, making every building different and special because every *client* is different and special, Moore seems to have avoided both the autocratic, leveling excesses of many of the Modernists, and the whimsical confusion of many of their successors. He has created an architecture that is personal, provocative, jubilant—and likely to last.

A collaborative effort in which Moore participated, Piazza d'Italia, New Orleans, was completed in 1978.

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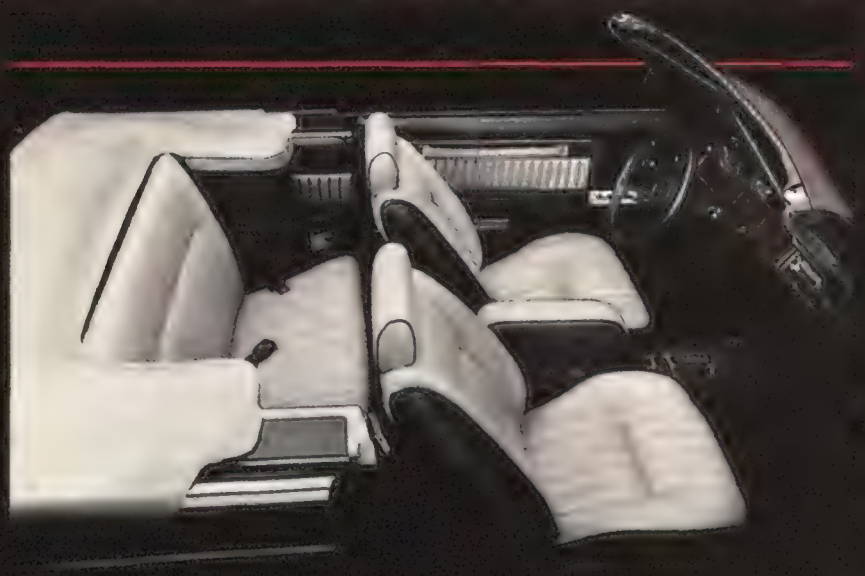

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BUCKLE UP FOR SAFETY.

By Lionel Casson

The first Olympics: competing 'for the greater glory of Zeus'

There was bribing, boasting and jeering of losers, and only first place mattered, but judges kept almost no statistics at all

Uffizi Gallery, Florence

Two pancratiasts battled until one gave up. In regular wrestling, winner got the first three falls.

In Olympia today, morning sunlight floods ancient colonnade in palaestra where wrestling took place.

One midsummer day in the year we calculate to have been 776 B.C., a 200-meter dash was run in a rural backwater in southwestern Greece, and a young local named Coroebus won it. It was an obscure event in an obscure spot but it earned him immortality: he is the first Olympic victor on record.

It came about this way. Not far from his hometown, in the place called Olympia, was a primitive sanctuary to the Greeks' chief god, Zeus. Festivals for the deity had been going on there for centuries. For some reason the people in charge decided to embellish what was traditionally done: they would offer up, in addition to the customary sacrificial victims and prayers, the honor of an outstanding athletic performance. So they organized a race, the race Coroebus won.

The next embellished festival was scheduled for 772 B.C.—and from then on, every four years, it took place more or less without a break for more than a millennium, right up to A.D. 261. And what began as a simple neighborhood affair soon burgeoned into a celebrated spectacle, boasting a dozen or so different events that pulled in contestants and viewers from all over. They came from the whole ancient world, from as far away as what are now France and Syria. There were other religious festivals, some very important, whose programs included sports, too, but none ever attained the prestige of the Olympics. Then as now, a victory there

Photographs by Alexander Tsiaras

British Museum, London

Boxers wrapped their fists in leather thongs, fought without a break until one was knocked out or gave up.

Fluted stone segments from fallen columns mark the collapsed Temple of Zeus, built about 470-456 B.C.

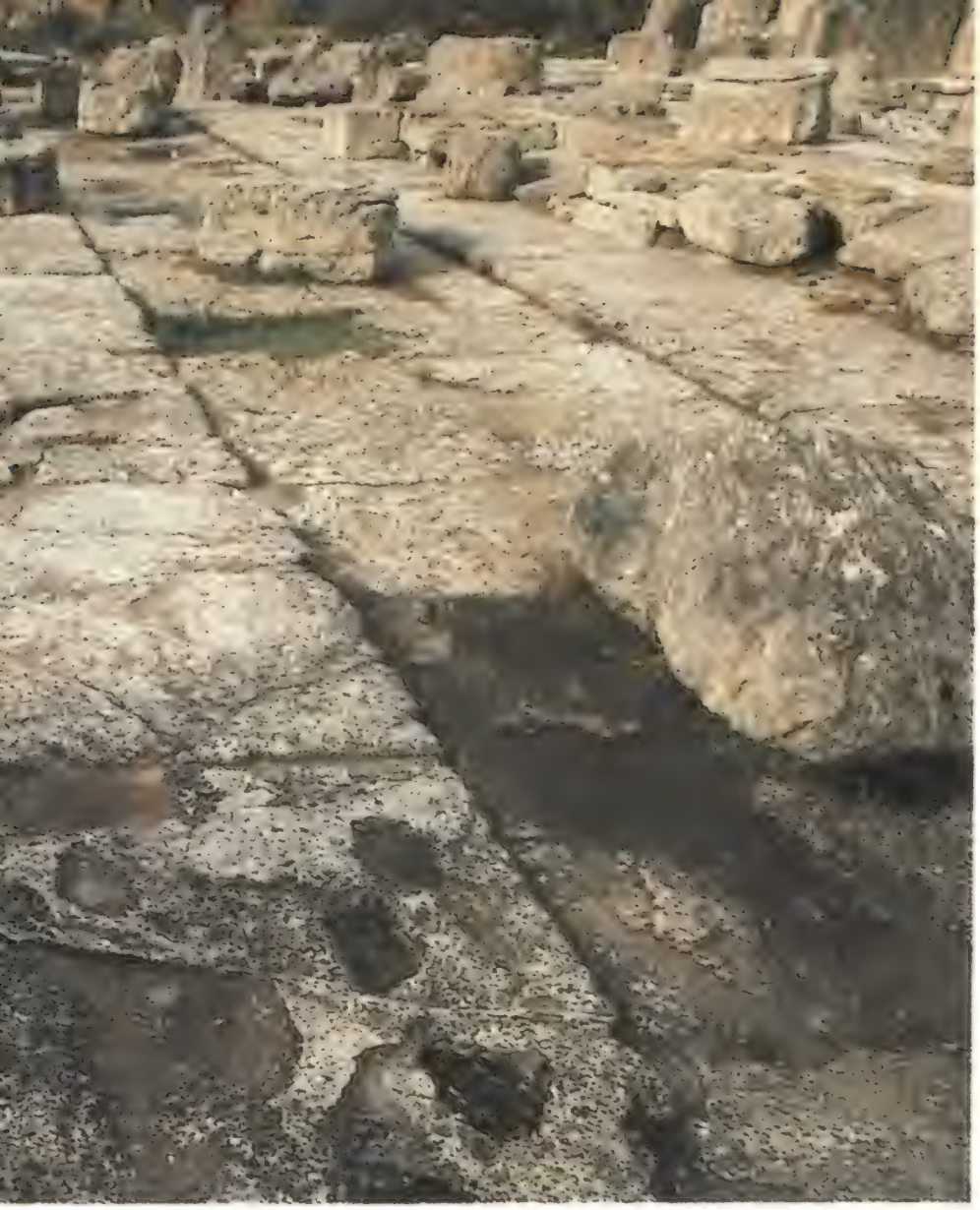
was the be-all and end-all for all truly serious athletes.

Despite the growing renown of the Olympics, despite the fact that it attracted tens of thousands of people, the time and place were constant: everybody had to make the long and arduous pilgrimage to the out-of-the-way sanctuary. And when there, everybody, right up to champions of the highest repute and backers who sometimes were heads of state, had to submit to the arrangements, rules and regulations enforced by a local committee—about ten worthy citizens of Elis, the chief town of the area.

That was the way things were at the beginning and that is how the ancient games continued to be: for the greater glory of Zeus, not to improve the political image of any particular state or leader, as is sometimes the case today. And there was little fine talk of promoting international goodwill or anything like that. At the time the festival was launched and for four centuries afterward, the Greeks were organized into a multitude of little independent states, and one or more of these was always at war with another. When the date of the festival drew near, heralds were sent out to announce a sacred truce so that those who wanted to attend could make their way through the battle lines to get to Olympia. After a while, the truce was lengthened to three months or so because travel time increased as spectators and contestants flocked in from farther and farther away.

For some centuries there were no athletic facilities whatsoever at Olympia, just an open space in which a running track would be paced off, areas for the discus and javelin throw laid out, and so on. Finally, by about 500 B.C., a few amenities had come into existence: a stadium for the runners and a hippodrome for the horse and chariot races (but no stands with seats for the spectators, just a sloping embankment to sprawl on), a bathhouse for the athletes, a headquarters building for the Olympic committee, and, of course, a temple to Zeus. Progress was slow because funding depended upon contributions.

Los Angeles, site of the 1984 summer Olympic Games, is better off than Elis was, for it at least can collect gate receipts; in ancient times, since the games were part of a religious ceremony, no admission could be charged. As it happens, Elis was not poor, but it was in no position all by itself to undertake a building program of the size needed. It was able to start work on Zeus' temple only when a successful war against a neighbor provided enough booty for the labor and materials. Many of the other improvements came, if



Games were invented to honor Zeus, and winning athletes received their olive wreaths at his sanctuary.

at all, from generous wealthy states or individuals.

There was not even a gymnasium until sometime after 200 B.C.; the athletes worked out wherever they could. Though eventually there was the equivalent of a VIP hotel, there were never any facilities at all for ordinary spectators. They arrived hot and tired and stayed that way during the five days the festival lasted. The rich were not too badly off: they slept in tents that their retinue of slaves put up. Most, however, slept in the open and munched on bread, cheese and olives, and drank wine they had brought along or bought from itinerant vendors. Sanitation was rudimentary or nonexistent and water, from springs and cisterns, was always in short supply. It was not until the second century A.D., after the games had been going on for about 900 years, that Herodes Atticus of Athens, at the time probably the richest Greek in the world, finally gave the place an aqueduct and a proper water system. In addition to all this, there was the heat and dust of a Greek summer and the flies—so bad that it is said the citizens of Elis used to offer up a special sacrifice to Zeus to keep them away from Olympia. The story goes that all a master had to do to make a sulky slave turn angelic was to threaten to take him along to the games.

"Aren't you all jammed in together?" asked the Greek philosopher Epictetus of would-be spectators. "Isn't it hard to get a bath? Don't you get drenched when it rains? Don't you get fed up with the din and the shouting and the other annoyances?" The answer in every case was a resounding Yes!—but this did not stop people from coming in droves. After all, the Olympics gave them, as ours do us, the one chance in four years to see many of the world's very best athletes in action. And there were other rewards. They could attend the sacrifices and services—which, now that the festival had gained such fame, were impressive ceremonies. They could get a look at some of Greece's finest works of art: a gigantic statue of Zeus in his temple was one of the Seven Wonders of the Ancient World, and all over the sanctuary grounds were statues of other deities and of winning athletes. Imagine today's Olympics being held, say, in Rome during Easter Week and you get some idea of why so many made the long journey and put up with all the discomforts.

Like a number of key features of Greek life, the games were for males only. With the exception of a special priestess, married women were barred from entrance—and on pain of death, no less. Since the assemblage of spectators was joined by the kinds of people who lived off crowds—pickpockets, beggars, con men, pimps, prostitutes—it was no place for respectable unmarried women. (Other festivals eventually ran events for women athletes, but never the early Olympics.) On one occasion a matron from a great sporting family, who could not bear not seeing her son compete, sneaked in dressed as a trainer; when he was victorious, she enthusiastically vaulted the barrier that marked off

Antikensammlungen, Munich

Poised competitor, from fifth century B.C., wields discus with owl, which was symbol of the goddess Athena.

Stone lion heads were originally designed to be drain spouts for water on roof of the Temple of Zeus.

the trainers' section and, in so doing, revealed her sex. Out of respect for the family's long line of winners she was spared execution, but a ruling was passed stating that trainers, like athletes, were to go around naked.

Shortly after 500 B.C. the program of sports reached its more or less final form—three days of major competition given over to about a dozen different events. It most likely started with the most spectacular, the chariot race. The number of entrants varied each year; at a comparable festival, the Pythian Games held in Delphi, there were as many as 41. The competitors lined up, each standing in a two-wheeled chariot that was light, like a modern trotter's gig, but pulled by a team of four horses that would be driven at the fastest gallop they could generate. They made 12 laps around the course—about nine kilometers—with 180-degree turns at each end. As at our Indianapolis 500, viewers enjoyed not only the excitement of a race but the titillation that comes from the constant presence of danger: as the teams thundered around the turns, or one chariot tried to cut over from the outside to the inside, crashes and collisions were common and doubtless often fatal. In one celebrated race at the Pythian Games, competition was so lethal that only one competitor out of several dozen managed to finish!

Next came the horse race, and it, too, offered the spice of danger because jockeys rode bareback on earth just churned up by the chariots. Both of these events were strictly for the very rich; owning a racehorse in ancient times was like owning a Rolls-Royce today, and owning a chariot and team was like owning a fleet of four of them. In the very beginning the owners may have done their own driving and riding, but they soon turned these jobs over to professionals. The prize, however, went only to the owners. Once, for example, a famous mare named Αὔρα (Breeze) threw her rider at the very beginning of the race, but being well trained, covered the course in perfect style and came in first; the judges awarded her owner the prize. Women owners, who could not even get inside the grounds to watch, could yet win a prize this way, and there are the names of some in the lists of Olympic victors.

The chariot and horse races were the showiest events. But the crowd's favorites tended to be the body-contact sports—wrestling, boxing and the pancratium (a combination of the two)—which the arrangers of the program shrewdly scheduled for the fourth day, the latest possible. Wrestling was the mildest of the three. Unlike today's wrestling, the contestants were on their feet most of the time, since three falls ended a match and even touching the ground with the knees constituted a fall. Ancient wrestlers, like our TV mammoths, ran to size and beef. A certain Milo, who lived around 500 B.C., was so mighty a man that a whole series of fabulous stories grew up about him: that every day he packed away seven and a half kilos each of meat and bread, washing it down with seven and a half liters of wine; that he once carried a full-grown bull around the stadium, then cooked and ate it; that he could tie a band around his head and snap it by swelling his veins.

Lionel Casson is a classics professor at New York University. His new book, Ancient Trade and Society, *was just published by Wayne State University Press.*

Statues of Zeus were erected with money from athletes fined for dishonoring the games by taking bribes.

Metropolitan Museum of Art, New York

A local athlete is honored. Proud hometowns sometimes gave Olympic winners a special purse.

Fight crowds in any age like to see blood, and ancient boxing supplied plenty. The men fought with their hands wrapped in tough leather thongs, they fought continuously with no rounds and they fought till one was knocked out or gave up. It was a rare boxer who, after several years in the sport, still had uncauliflowered ears and all his teeth; boxers' battered physiognomies became a favorite butt of contemporary satirists, whose humor was crueler than ours.

The bloodiest and most popular event was the pancratium, or "all-powerful contest," a modified free-for-all. The contestants punched, slapped, kicked or wrestled, and the bout was over when one was knocked out, gave up or—as happened every now and then—died. No holds were barred, not even the stranglehold, and much of the time, as with today's wrestlers, the contestants were thrashing about on the ground, since a fall did not matter. One pancratiast actually developed a technique in which he would throw himself on his back with his opponent on top and work from there; he was never beaten. There was also biting and gouging, though these were theoretically illegal. The end usually came when one man got such a hold that the other quit to avert a broken bone or dislocated joint.

The first Olympic event to be recorded, Coroebus' race, was a straight run the length of the course, in effect a 200-meter dash. Soon a second race was introduced: down the course and back, a 400-meter dash. A long-distance run was added of nearly 4,800 meters, and then even a dash in which contestants ran in armor. These were the only track events; the marathon in today's games is a modern idea. The field events were three: broad jump, discus throw, javelin throw. They were never independent contests but always part of a curious mix called the "pentathlon," the "five-contest": the jump, discus and javelin followed by a 200-meter dash and a wrestling match. If a man took three of the five he was the winner.

It is hard to see how any one athlete could develop high skill in so many different sports. Yet the pentathlon was one of the earliest items in the Olympic program. It was sandwiched in between the spectacular horse events of the second day and popular body-contact bouts of the fourth. The modern Olympics, begun in 1896, made things easier by deleting the wrestling. After 1924, the men's pentathlon was dropped entirely, although the Olympics had already instituted a quite different competition, known as the "modern pentathlon," involving, among other things, horsemanship and pistol shooting. This year's games are going to include, at least for women, a version that goes the ancient pentathlon two better: a heptathlon—a seven-part contest, all track and field.

The fifth and last day was devoted to prize giving. Winners formed a procession and marched to the Temple of Zeus. It was an ancient version of the ticker-tape parade, since bystanders along the route showered them with leaves and flowers. At the temple, each was handed what ancient athletes considered the most precious object in the world, the victor's olive wreath. Its intrinsic value may have been nil, but it was worth a fortune to the man who walked away with it. An Olympic victory, as it happens, was just as great an

British Museum, London

Greek charioteer reins in rampaging team; racing was Olympics' most spectacular (and dangerous) event. Dozens competed, but during the nine-kilometer race, many chariots smashed up taking 180-degree turns.

honor for a winner's fellow townspeople as for himself, and they sometimes showed their gratitude by voting him a cash bonus—sometimes even a pension for life—as well as other perquisites. Moreover, Olympic champions were welcomed as contestants at festivals where bountiful cash prizes were awarded.

All such benefits were for winners only. Vince Lombardi would have been right at home in the ancient Olympics. Winning was everything; there were no seconds or thirds, no Greek equivalents of silver or bronze medals. And modesty in victory was not required. It was expected that a winner would savor his triumph to the full, would publicly exult in it. The Greeks did not go in for our ceremonious "sportsmanship," the generous congratulations of the vanquished. Far from it: losers were jeered and, hiding their heads in shame, slunk away. Even their mothers treated them with scorn. "The wreath or death" was the motto.

Greek record keeping, too, was very different. Almost no records were kept of the actual distance a winner jumped, or threw the discus or javelin, or the exact time it took to win any of the races. In ancient Greek, there isn't even a way to say "set a record" or "break a record." What interested people were "firsts."

In the beginning, Olympic athletes tended to be aristocrats. Only they had enough free time to go in for the extended work needed to train a man up to championship standard, as well as the free time and the money to travel to the festival every four years. Besides, most aristocrats had a good head start since wrestling, running and other sports were the way Greece's gilded youth spent its leisure. As the years passed, though, lesser folk managed to enter the competition, and in increasing numbers. Perhaps this was what prompted a famous crack by Alexander the Great, a very fine runner, when he was urged to enter the dash: "Only if the contestants are kings." One reason that common folk came to compete more was that hometowns took as much pride in a victory as did the victor himself. When a promising lad turned up, they would subsidize him; they did for their athletes what American corporations today do for ours. And once the lad had racked up a win, between bonuses and prize money at other cash-paying festivals, he was set for life. One ancient Olympic victor was offered 30,000 drachmas—the 1984 equivalent of at least half a million dollars in purchasing power—just to take part in some local festival; our barnstorming tennis stars do not do much better. Then as now, the popularity of a man's sport made a difference. Where cash prizes were given, the reward for a win in the pancratium could be six times that for a win in the pentathlon.

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*Based on EPA Interior Volume Index.

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There was a price to be paid for getting into the charmed circle of Olympic winners, the same price paid today: endless, grueling training under the iron rule of the best coaches to be found. These had their special techniques, some of which make sense, some of which do not. Runners, for example, were probably paced by men on horseback. Boxers shadowboxed and worked out with the punching bag. Wrestlers worked out with partners called "statues" in the Greek sports jargon. Pancratiasts worked out with a punching bag heavier than the boxer's type, and they not only practiced punching it but kicking it as well. They also let it bash them on the head, presumably to accustom that member to a bash from a fist.

Trainers had their hang-ups about food, then as now. When it came to fish, to eat or not to eat depended on the kind of seaweed the fish fed on. As for meat, pork from pigs pastured along the shore was taboo, since the chances were they had fed on the sea garlic that flourished there. One trainer refused to let his charges go to dinner parties on the grounds that intelligent conversation would cause headaches.

All entrants were eventually compelled by the rules to train continuously for the ten months prior to opening day. The last month of training was conducted at Elis under the gimlet eyes of the judges. This procedure immeasurably impressed the competition since any who saw themselves clearly outclassed would quietly take off to avoid the shame of defeat.

The word "judges," when applied to the ancient Olympic committee, is a misnomer. Although the Greeks called them that, judging was only a small part of their duties. They checked the credentials of the competitors, supervised their training at Elis, served as referees and umpires, heard complaints of fouls and bribery. They were chosen by lot from a list of wealthy locals likely known as generous contributors.

If chosen, a man got the chance to be an absolute autocrat within the area of his competence and to display his importance by strutting about in a special purple robe and carrying a whip, followed by whip-carrying flunkeys. For the judges could punish athletes who had broken training—or committed fouls or accepted bribes—not only by fines or expulsion from

Runners, like these shown c. 530 B.C., contested in only four distances at Olympia: 200- and 400-meter dash and a 4,800-meter Greek "mile," as well as a cumbersome sprint that had to be run in armor.

Metropolitan Museum of Art, New York

the games but also by scourging, a most unusual procedure since Greek practice was never to lay a whip on a freeman (this was something reserved for slaves). Money from the fines went to erect statues of Zeus inscribed with appropriate sentiments, e.g.: "Show that you win at Olympia with the speed of your feet and the strength in your body, and not with money." The bribes seem not to have come from gamblers or betting combines but from fellow athletes who wanted a victory desperately enough to try buying it. Hometowns were so fervently behind their boys that even bribery did not faze them. When an Athenian pentathlete was fined for trying to bribe his way to a win, the Athenians sent out a top advocate to plead for him; when that failed, they paid the fine themselves.

The original Olympic Games endured for so long because they were part of a religious festival, an offering to the great god Zeus. Ironically, what kept them going was also what brought them to an end. As more and more of the ancient world turned to Christianity, Zeus was gradually forced to abdicate his throne. The Olympics were held, regularly as clockwork, down to A. D. 261, when a threatened invasion of barbarians, the Herulians, interrupted the long sequence. The games were quickly resumed and continued—whether unbroken or not we do not know—until 393, the year in which the Roman Emperor Theodosius I, a fervent Christian, ordered the closing of all pagan centers. The site was abandoned. Over the centuries it was devastated by invaders, battered by earthquakes and gradually covered by silt from floodwaters of a nearby river. All this, together with endless years of neglect, left it buried until a British traveler found it in 1766. In 1875 the first of a number of German archaeological teams set about a systematic excavation.

Soon afterward, a French aristocrat, Baron Pierre de Coubertin, was passionately promoting the cause of athletics in general and a revival of the Olympic Games in particular. Resurrection of the site spurred him to even greater efforts, and in 1896 he finally achieved his dream: the first modern international Olympic Games. But they were held in urban Athens, not rural Olympia—the modern spectator took a dim view of sleeping alfresco, or even under a tent.

This is the track at Olympia on which athletes ran for fame, fortune and the greater glory of Zeus. It is 200 meters long and has no stands; spectators sprawled on grassy banks. The judges' box is at center.

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ROYAL CARIBBEAN

Song of Norway, Song of America, Nordic Prince, Sun Viking
Ships of Norwegian Registry

u Were A Kid, o Take A Cruise.

By Jack Fincher

Casts and 'cat scans' put ailing animals on road to recovery

Gaudily trussed Holstein heifer emerges from hernia surgery at large-animal hospital near Philadelphia.

State-of-the-art technology and old-fashioned concern make University of Pennsylvania veterinary school a Mayo Clinic for creatures

The University of Pennsylvania started up a pioneering program in veterinary medicine 100 years ago this fall. The horse was still king in those days and the new school in Philadelphia had a decidedly equine flavor right from the start. The first dean, an energetic practitioner named Rush Shippen Huidekoper, was himself an accomplished horseman who not only rode to hounds but also enjoyed walking his mare, Pandora, along railroad trestles and jumping her over highway tollgates. When Pandora died, according to one account of the school's early days, Dean Huidekoper arranged "a lavish dinner in her memory at the staid Philadelphia Club and invited some of the town's most distinguished citizens." After regaling his guests with stories about his beloved mare, Huidekoper startled them with the news that the very same creature had just been served up as the banquet's main course.

Today, doctoring horses remains a specialty of the house, but in most other respects the veterinary school of the University of Pennsylvania bears a closer resemblance to the Mayo Clinic than to its institutional forebear. It is one of the country's most respected centers for basic research and a leader in medical treatment as well as an esteemed school for 200 faculty members and 430 students. It consists of two remarkable campuses, one urban and one rural. Large animals are ministered to at the New Bolton Center near Kennett Square, about 35 miles west of Philadelphia. Situated on 1,000 acres of rolling farmland, New Bolton is an impressive collection of more than 70 buildings, including a hospital, barns, stables, laboratories and research facilities. Small animals are treated at a new three-building complex on Penn's venerable downtown campus. The hospital there—it's called the Veterinary Hospital of the University of Pennsylvania, or VHUP for short—contains everything from elaborate surgical facilities and pathology labs to a modern intensive-care unit and a wildlife clinic.

Each year, nearly 30,000 creatures are seen at these two campuses. The majority of them are cats, dogs, horses and cows with an udderly predictable assortment of aches, pains and itches. More than a few of the patients and their ailments, however, are a bit unusual.

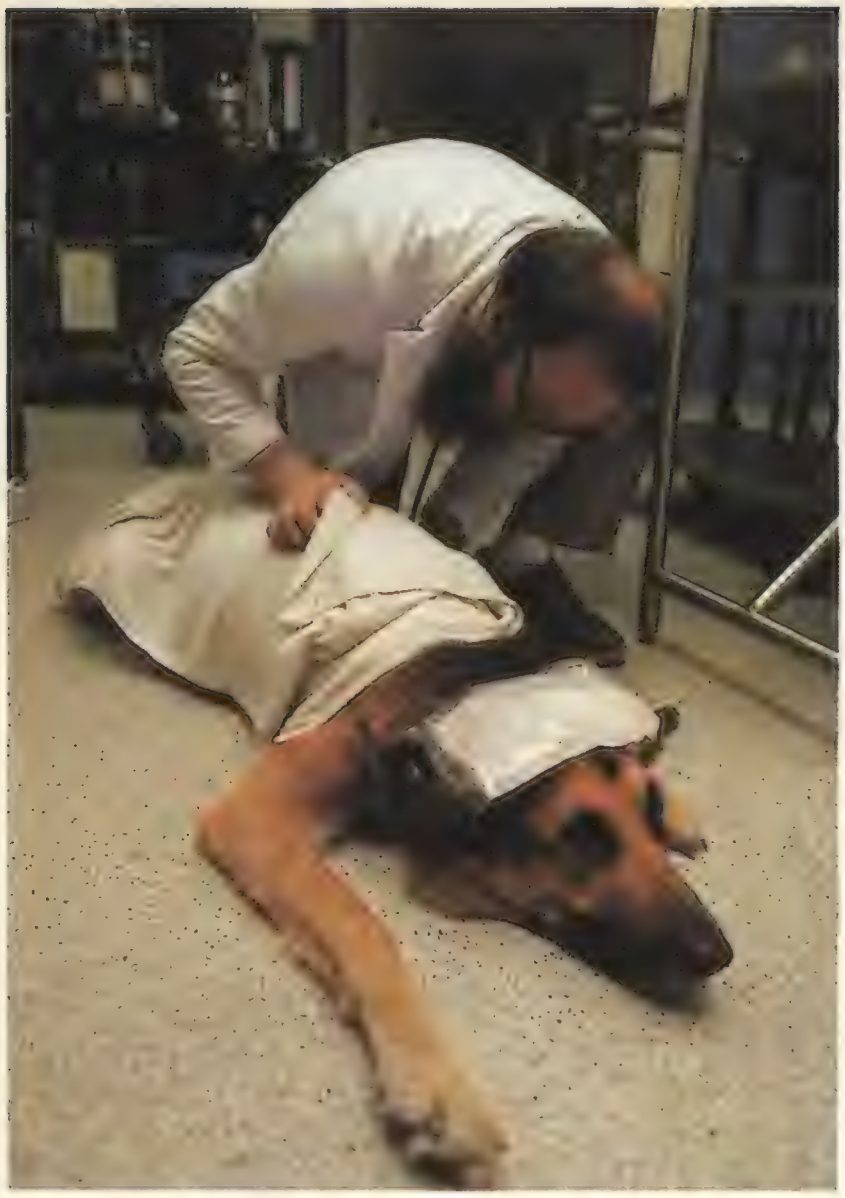
Not long ago, for example, a 400-pound tortoise with a broken leg ended up in the orthopedic room at the Philadelphia facility. First, surgeons there set the fracture. Then they outfitted the tortoise with a skateboard to trundle around on during its convalescence.

VHUP operates an emergency clinic, and recently a distraught woman called to report that her German shepherd had swallowed a butcher knife. Dubious, the veterinarian on duty advised her to bring the dog in for a look. Sure enough, radiographs taken at the hospital showed a ten-inch knife blade lodged in the dog's esophagus (p.78). Surgeons removed the blade and the dog went home a few days later.

Both VHUP and the New Bolton Center are equipped with the latest diagnostic equipment, but sometimes modern technology is no match for Mother Nature. When yet another ailing tortoise showed up

Hobbled by bulky bandage, thoroughbred is led back to stall by Penn nurse after operation for broken leg.

Photographs by Louie Psihoyos



Ice pack on head cools feverish patient at emergency ward of Penn's small-animal hospital in Philadelphia.

University of Pennsylvania

Can a dog swallow a butcher knife and live? One did. Penn radiograph shows ten-inch blade in esophagus.

one day, the doctors on duty decided to give it a barium X ray in hopes of identifying the source of its intestinal trouble. There was, it turned out, a slight hitch. Humans can pass a dose of barium through their digestive systems in one day but the tortoise's slow-moving system took all of two *weeks.*

Notwithstanding such unpredictable glitches, Penn's veterinary school prides itself on providing its patients with "the best care that both human and animal medicine can offer," says Dr. John E. Martin, who is Special Assistant to the Dean. The same boast can be made by many of the nation's 26 other major veterinary schools. The difference is that Penn has been at it longer than all except one of the others (the Veterinary College at Iowa State in Ames was established in 1879) and in that time it has blazed a bold trail in a number of important areas. It was one of the first veterinary schools to function in close association with a top school of medicine. It was one of the first to embrace the concept of specialization as opposed to general practice. It excels in the field of comparative medical research aimed at identifying similarities between human and animal diseases, and it has broken new ground in the use of pets for human therapy (SMITHSONIAN, July 1981).

All of this is a far cry indeed from the "veterinary department" that opened for business in 1884 with 29 students and a dozen faculty members, ten of them medical doctors. The department's building at 36th and Pine Streets, right next door to the university's esteemed medical school, was completed just in time for the first term. It contained an amphitheater, a museum, a lecture room and some faculty offices. A blacksmith shop, several laboratories and a hospital were added in 1885. The original structure cost less than $20,000; student tuition was $100 a year.

The urgent need for authentic veterinarians in the United States had become clear long before Penn began producing them. Throughout the mid-1800s, one plague after another took an awesome toll of the nation's cattle, swine and other livestock populations. Since there were only a few hundred European-trained veterinarians at work in the entire country, much of the doctoring was done by quacks applying unscientific and often shockingly inhumane remedies.

The Pennsylvania school's mission was both humane and practical—to relieve suffering and to preserve animals "as useful aids to man." Although horses dominated its patient list at first, farmers and pet owners soon began bringing other animals to the hospital. A $10,000 gift from the prominent Philadelphia publisher J. B. Lippincott led to the establishment in that city of the first university small-animal clinic in 1892. By the turn of the century, the annual case load at the school had increased from a few hundred to nearly 5,000. The hospitalization fee ranged from one dollar a day for horses to 25 cents for cats and birds.

Jack Fincher wrote about the Ferris wheel in the July 1983 issue of SMITHSONIAN. *His article on new medical tools appeared last January.*

By providing students with animals to work on, the hospital enabled the school to fulfill its teaching function. In the original three-year program, which has long since been expanded to four years, students received instruction in basic sciences, medicine and surgery, worked as aides in the hospital and took charge of patients in the clinic. They also were required to perform autopsies and learn horseshoeing.

For the better part of 60 years, the institution maintained a solid educational reputation, but it fell behind in one critically important area: research. By the early 1950s, crippling financial problems and some untimely deaths in the dean's chair had left the school in disarray. The physical plant was falling apart, the faculty was anemic and the program's accreditation was seriously threatened.

In 1953, much to the dismay of some older faculty members, a dynamic young professor, Dr. Mark Allam, was appointed dean of the school. Though he had been on the faculty for only seven years, Allam had proved his mettle by rising to the chairmanship of the surgery department. As dean, he moved decisively to restore leadership. One of his first acts was to call a meeting at his home with a few key people. He put the question bluntly: Should the school face facts and phase out?

The resounding answer was No, and from then on the institution enjoyed a remarkable comeback. Allam shook up the faculty, brought in new blood, raised significant sums of money and improved the school's facilities. He and his successor, Dr. Robert Marshak, also set their sights on new goals. The school developed a strong research program in the basic and clinical sciences that moved it into the forefront of work in such disciplines as medical genetics, reproductive physiology and cardiovascular diseases. Beginning in the 1960s, it forged ahead in the development of such clinical specialties as dermatology and neurology. It created courses of continuing education for the country's 15,000 practicing veterinarians. By that time, in a visionary move that has since paid spectacular dividends, it had already acquired the farm near Kennett Square that would become the New Bolton Center.

More than 4,000 large animals are treated each year at New Bolton and most of them are horses. It wasn't all that long ago when a horse with a broken leg was automatically put away. Today, pleasure-horse owners

University of Pennsylvania Archives

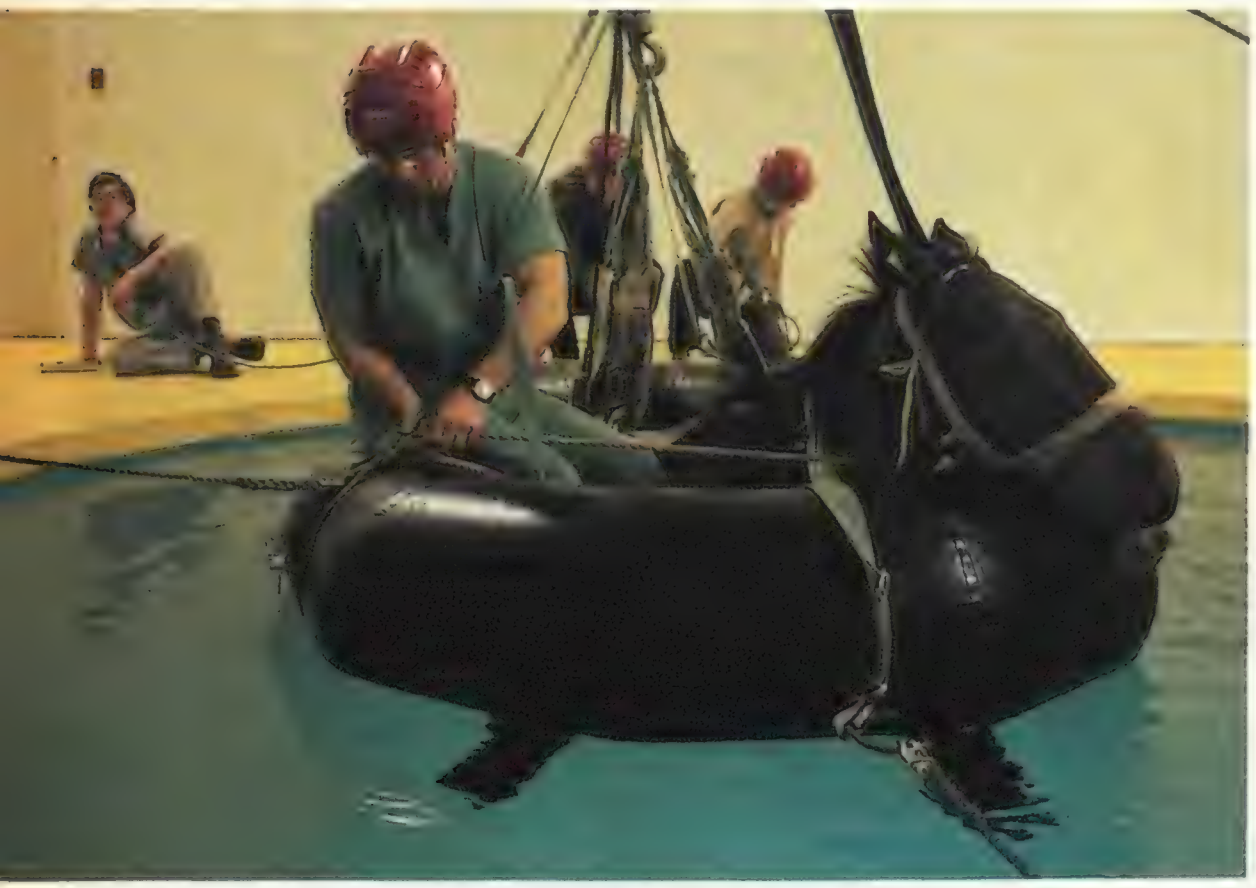
Rush Shippen Huidekoper, the first dean of Penn's vet school, rode Pandora for photographer Eadweard Muybridge's study of animal locomotion. Muybridge's photographs were taken in right-to-left sequence.

and racing magnates from all over the East Coast send their animals to New Bolton not only for treatment of injured legs but also for just about anything that ails them. A guiding force behind the development of the center was a Swiss surgeon, Dr. Jacques Jenny, who perfected a number of new orthopedic techniques. Jenny first gained fame in 1958 when he performed an operation that enabled the celebrated racehorse Tim Tam to recover from a cracked bone.

Jenny is given credit for coming up with a tidy way to prevent anesthetized horses with severe fractures from re-injuring themselves when they emerge from the anesthesia. At New Bolton, the unconscious animal is removed from the operating table by a hoist, slipped into a rubber raft with holes for its legs and floated in a pool of warm water (below). Suspended in that fashion, the reviving patient cannot put weight on the injured limb or bang it against a solid object, and the resistance of the water cushions its flailing movements.

Jenny died in 1971 but his work is being carried on by Dr. David Nunamaker, a Penn graduate who studied in Switzerland. Nunamaker teaches at New Bolton, heads up the large-animal surgery department and does research on the problems of stress fractures in thoroughbred racers. He is also continuing Jenny's work in the field of internal fixations of fractured bones—using things like wires, plates and screws—and refining the use of external devices including casts, braces and orthopedic shoes.

Nunamaker and other researchers at New Bolton employ state-of-the-art technology to measure the effects of stress on racehorses. One instrument, a strain gauge, is attached to a bone in the horse's leg. When the animal runs, the gauge transmits stress data by telemetry to an oscilloscope. The data are then ana-



After surgery, horse is hoisted from operating room and floated in pool to prevent it from re-injuring limb.

Penn's farrier still works at a forge, but to design these orthopedic horseshoes he must refer to X rays.

In outpatient clinic at large-animal hospital, Dr. Ben Martin zaps curious horse with a laser gun. Lasers are sometimes used instead of needles for acupuncture treatment of chronic lameness, wounds, pressure sores.

lyzed by a computer. Another electronic device, called a Digitizer, combines computer analysis with photographs to analyze the strength of a horse's limb.

In some ways, New Bolton is reversing the relationship that has long existed between human and animal medicine. Originally, heart catheters, electrocardiograms, spinal anesthesia and the tuberculin test were all taken from experimental veterinary science by medical practitioners. Now, Penn researchers are adapting acupuncture and arthroscopic surgery from sports medicine and other human clinical specialties.

New Bolton's small-animal counterpart in Philadelphia, VHUP, has the gleaming look and efficient atmosphere of a major general hospital, which it is. On one recent day in its so-called "exotic ward," the cages were full of variously afflicted creatures. There was a prairie dog with chronic upper-respiratory distress, a South American parrot named Fruitloops with a prolapsed cloaca, and a yellow-crowned Amazon parrot named Daphne, left too weak to stand or swallow by an unidentified infection (p. 82). There were also three parakeets—one with lead poisoning, another with a hernia from a surgically removed egg, the third with a benign fatty tumor growing prominently on its breast.

Between incoming calls from anxious owners, nursing supervisor Liz Wilson talked about her patients. "That parakeet is a free-flyer and got poisoned from old wall paint. All psittacines have to chew on hard things or else their beaks keep growing.

"The doctor will pop that parrot's cloaca back in, put a tiny purse-string stitch around it and draw it tight. The other parrot we're tube-feeding. If we weren't, she'd be dead."

The phone jangled and Wilson answered. "The doctor is worried about the anesthesia with Woody's surgery," she told the caller. "His liver is not back to normal. But we're concerned that if we wait much longer, that tumor is going to be too large to remove. You want to think about it? OK, call me back soon."

Wilson hung up and resumed her conversation. "You've got to like the variety here," she said. "We once had a black swan named Clyde. He lived in a pond on a big estate. The owner's Labrador retriever retrieved Clyde one day and broke his leg. I used to tuck him under my arm and take him to the whirlpool. He was so huge his head would come around the corner before Clyde would." Liz Wilson laughed. "This is a fascinating field," she said. "You celebrate the day an animal gets well enough to bite you."

Next door, the school's colonies of research animals mewed and barked, clamoring for attention like backyard pets everywhere. But these are not ordinary cats and dogs. They are carriers of rare genetic coding errors similar to those that afflict human beings. Selectively bred through many generations, they provide invaluable models for comparative study. They are subjected to certain biochemical tests but not to any form of experimentation that might cause distress.

Led by Dr. Donald Patterson, the school's medical-genetics department began its studies two decades ago with a monumental screening of 10,000 dogs for congenital heart malformations. The researchers were

looking for structural defects that result in oxygen-starved "blue babies," whose clinical manifestations are virtually identical in both dogs and people. By breeding litters in which as many as nine out of ten pups may be affected, Patterson's team was able to remove embryos at different stages and put together a blow-by-blow picture of how the defects developed. That picture enabled cardiologists to pinpoint the places where problems were likely to occur in humans, and surgeons could then operate accordingly.

In recent years, the school's research program has been broadened to include more subtle human-related metabolic deficiencies such as Fanconi syndrome in dogs and a disease in cats referred to as MPS. In Fanconi, an enzyme that normally conveys sugar and salt into the kidney goes awry, causing fatal kidney failure. MPS belongs to a family of diseases in which enzymes fail to do their job of breaking down large molecules within body and brain cells. The results, in both cats and children, are dwarfism and mental retardation. From their biochemical testing on animals, Penn researchers hope to discover clues for earlier detection and treatment of both diseases in children.

The veterinary school is exploring other vital links between Man and animal in its Center for the Interaction of Animals and Society. The center is headed by animal ecologist Dr. Alan Beck, who previously worked for the Bureau of Animal Affairs in the New York City Health Department. In Philadelphia, Beck and Dr. Aaron Katcher along with other associates are known for their research on the health implications of pets. They have found that pet owners are less likely to have heart trouble than those who do not keep pets.

"Pet owners get involved with their animals in ways that are good for their health," Beck says. "As a result, they seem to have lower blood pressure. Ninety-nine percent of the dog owners we studied in one project, for example, said they talk to their pets. That mitigates the destructive symptoms of loneliness associated with high mortality." But what about the other one

Swaddled in blanket, ill parrot submits to sampling of blood from its foot by small-animal nurse Liz Wilson.

Great horned owl and student watch as vet takes out stitches from an operation to repair a broken wing.

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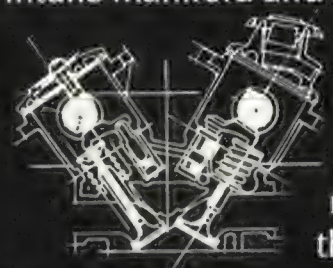

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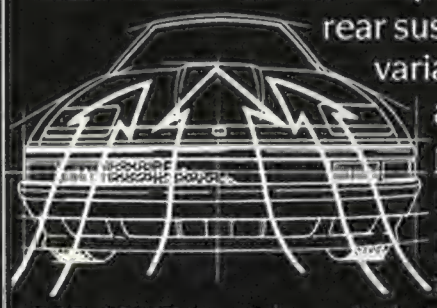

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Philadelphia youngster, worried about his pet, lets cat out of the bag while awaiting their turn at hospital.

percent? "They lied," Beck says with a chuckle. "*Everybody* talks to his dog."

While owning a pet may be healthful, losing one can be devastating. Social worker Jamie Quackenbush is employed at the center as a bereavement counselor to work with grief-stricken owners. "I try to help them realize that what they are going through is natural and understandable," he says.

Beck and Katcher have demonstrated that, in an institutional setting, even tiny animals as varied as tropical fish and goldfinches can have a therapeutic effect on people. In a human blood-pressure study, tanks of fish set up in the high-anxiety atmosphere of a dentist's office had a tranquilizing effect similar to that of hypnosis on patients. Much the same thing was observed by center researchers among patients at a state mental hospital outfitted with cages of finches. The birds not only eased the patients' feelings of hostility; they also improved attendance at therapy sessions.

Beck knows full well, however, that people and animals do not always hit it off. Dr. Victoria Voith runs a behavior clinic at the center to work with problem dogs and their owners. Annually, hundreds of animals are brought in because they are biters, resist housebreaking or fight with other dogs. "About half of the families in the United States have pets," Beck says. "But millions of those pets are killed in animal shelters every year because the owners can't handle them or don't want to bother. So the people who bring their pets to the center or to VHUP are a select sample. They care enough to spend energy, time and money."

Knowing that makes the work more meaningful for VHUP's doctors and nurses, but sometimes it adds a special burden, too. Carole Contel, nursing director, tells of a dog owner who spent $10,000 over the years for his pet's treatment for cancer at the hospital, only to have the animal die. "Now there's a 75-year-old man who comes here every day to visit a fluffy little Maltese dog whose heart keeps stopping," she says. "The man drives 160 miles. Every time he sees the dog he cries. Two years ago, his wife and son were killed in an accident. The dog is all he has left in the world. That makes us try a lot harder."

One of the things that makes the veterinary school such a resourceful medical center is its close working relationship with other institutions in Philadelphia. Tumorous cats and dogs at VHUP are routinely given exams on Penn's medical-hospital's CT scanner. An ailing infant orangutan from the Philadelphia Zoo was given a sophisticated diagnostic workup at the Children's Hospital of Philadelphia. And sometimes the fact that help is just around the corner means the difference between life and death in crisis situations. In VHUP's emergency unit, for instance, a diabetic cat was in trouble not long ago. "We need an intravenous solution with low sodium," observed Dr. Rebecca Kirby. As matter-of-factly as a housewife borrowing a cup of sugar, one of Kirby's assistants hurried down the street to the medical hospital. She returned in minutes with the proper fluid, and the cat survived.

But having a lot of professional neighbors is not an unmixed blessing. A while back, a farmer reportedly drove his truck up to the vet hospital in the middle of Philadelphia and unloaded a herd of sick dairy cows. The farmer insisted that he had heard some mighty good things about the place and he wasn't budging until his cows were attended to. Presumably, the place he had heard about was the Veterinary Hospital of the University of Pennsylvania. The place where he parked, though, was the Veterans' Hospital run by the U.S. government.

In comparative research lab, Mark Haskins monitors the heartbeat of a cat afflicted with genetic disease.

Dr. Hashins

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LONDON
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By Toni Bentley

The heart and sole of a ballerina's art: her toe shoes

Shoes must accommodate changing shapes, positions of the feet from at rest (left) to on pointe (right).

A New York City Ballet dancer interrupts a European tour to visit Freed of London's shoe factory, where she 'meets her maker'

This is the story of a business with a beautiful product that has never been so in demand. It is bought in vast quantities by women between the ages of 13 and 40—maybe 45. The business is British, with no franchises and, in this customer's eyes, no plausible imitators. Though the company has no monopoly on its product, it exports to virtually every country in the Western world. The product is expensive and its life span short: it is the toe—or pointe—shoe produced in Freed of London's factory.

In 1928, Frederick Freed, his wife and one helper left Gamba's, then the leading English toe-shoe factory, to begin one of the most successful toe-shoe businesses in history. In the period since Freed and his assistant started sewing shoes in the basement of what is now the retail shop at St. Martin's Lane, a short walk from Trafalgar Square, the popularity of ballet has soared. Today there are more professional and student dancers than ever before, and thousands of them buy from Freed's. Any dancer who spends as much as eight hours a day on her feet can tell you why: Freed's peach-color toe shoe is the lightest, slimmest, most elegant one available. It is also as comfortable as a tight, hard-toe shoe can be.

Freed's makes the toe—or pointe—shoes, but dancers sew on their own ribbons for precise fit. "I wouldn't let anybody else, not even my mother, do it," says one.

To accommodate its enormous clientele, Freed's factory has grown to 200 employees—and from two shoe "makers" to 25—at three locations, with the largest in Hackney in London's East End, and produces about a half-million pairs of toe shoes a year. Should Freed's ever close down because of fire, strike or bombing, the ballet world would be under a cloud while hysterical, flat-footed ballerinas protested that they could wear no other pointe shoe.

When the New York City Ballet was touring Europe last summer, our first stop was London. Many of the dancers wanted to visit the factory where our shoes are made. Their intention was to speak with their respective makers to discuss alterations; we are forever changing our requirements for both practical and esthetic reasons. Often a foot has simply changed shape from the endless maturing and shaping a professional career brings about: the metatarsal has grown wider and flatter; various lumps, bumps, corns and calluses have grown, changed or been removed. Sometimes the heel of the shoe must be cut down to virtually nothing because of sore tendons, bone spurs or sensitive nerves on the lower ankles. With new orders placed four times a year, we have four opportunities to alter our shoes' shapes, but with the long distance and paperwork that lie between us and our makers, we have grown skeptical about the amount of communication possible, and most of the ballerinas were determined to meet their makers in person.

A professional working dancer may easily use 12 pairs of new toe shoes a week, and often more. Under average circumstances, a pair lasts for 15 minutes of performing and is then ready for class, rehearsal, autographs or, most often, the trash can. A used toe shoe is not revivable—this is the secret of the eternal demand for new ones. A toe shoe is as eccentric as the ballerina who wears it; their marriage is a commitment.

Photographs by Mark S. Wexler

Battered feet stand side by side with instruments of torture: shoes shaped on bunionless, blisterless lasts.

Hammer blows to her toe shoe help Elizabeth Ferrell prepare it for wear at School of American Ballet.

Though experts at demolishing a new shoe, we had been ignorant of the materials and processes that precede our more destructive actions. A brand-new pair of toe shoes presents itself to us as an enemy with a will of its own that must be tamed. With the combined application of door hinges, hammer, pliers, scissors, razor blade, rubbing alcohol, warm water and muscle power—followed by repeated rapping against a cement wall—we literally bend, rip, stretch, wet, flatten a new shoe out of its hard immobility into a quieter, more passive casing for our feet.

Without music, lights, scenery, costume or false eyelashes, a ballerina can still dance, given some space. But if her shoes are taken away from her, she loses her technique, her grace and her ephemeral quality. She will literally descend into the world as a mere mortal if her means of support is taken from her. In the ballet *La Sylphide*, the sylph loses her wings and is thereby destroyed. But it was not wings that gave the famed original sylph, Marie Taglioni, her lightness, it was her pointe shoes. At her debut in 1822, Taglioni brought classical ballet onto pointe, and it has stayed there, sometimes shakily and with much pain, ever since. It is Taglioni whom we have to blame. Had she not been so charming, so ethereal and so graceful on her toes, the whole idea might have been dismissed as an unsuccessful experiment. Each time one of us stands on our toes it is still an experiment that we would often condemn as unsuccessful. But we are 160 years too late in voicing our feelings—besides, the applause contradicts us! And so we are silent; our complaints could not begin to compare with those of the early ballerinas.

From pain and fortitude, a magic symbol

Before the turn of the 20th century, pointe shoes came in only one size and were *made* to fit. A long narrow tube of satin-covered leather bound and squeezed the foot into the ideal esthetic—an inhumanly-shaped minuscule pointe that did not remotely resemble the naked foot that entered it. The result of this painful effort is the symbolic figure of the ballerina: an unworldly creature of magical qualities and supreme femininity. It is a symbol recognized all over the world, achieved by fortitude and sacrifice in a search for illusion, perfection and beauty. The toe shoe of the 19th century bound the dancer's foot as the Chinese bound their infant daughters' feet and as laced corsets bound the bodies of fashionable women (the satin used for toe shoes is the same silk-and-cotton mixture as corset satin). By the early 1900s, Pavlova was wearing a shoe that resembled the toe shoe of today. There were different sizes by then, but still only one width, and the shoe was leather. Not until the 1950s did the construction of toe shoes improve dra-

Caught in motion by photographer's open shutter, two dancers practice arabesques on pointe. Position, achieved by quick movement, is held for only a split second, but causes great pressure on foot and shoe.

matically in comfort, pliability, balance and strength.

Since I was satisfied with my own toe shoes, I had not visited Freed's, but after three weeks of touring I decided I had to see it for myself and made my pilgrimage from Paris across the Channel. A long tube ride from Heathrow Airport and a small taxi fare landed me at 62-64 Well Street in Hackney, London's oldest industrial area.

Factory director Bernard Kohler, a 35-year veteran of Freed's, welcomed me with lunch in the factory canteen. He trains the new makers himself, preferring to have men (makers are always men) with no previous "shoe experience," just as a good ballet school prefers young girls and boys without previous training. In both cases, time is wasted having to unlearn knowledge incompatible with the job at hand. He is a wiry, energetic man with a strong, handsome face and heavily scarred hands. All makers, as I was to see, have such hands—big, gnarled, scarred and skilled. Their look is poignantly mirrored by the dancers' feet, which are also strong, scarred and misshapen from wearing the shoes. In the making and the wearing, a toe shoe, ironically, is not a kind or gentle object.

As we ate, Kohler told me the story of the toe shoe. All the changes in the shoes' sizing, shaping and raw materials that have taken place since Freed's first opened have been innovations that closely followed the course of classical ballet. The shoes are in service to the dancer just as are the costumes, lights, scenery and makeup. As ballet technique has been dissected, refined, improved and quickened, the toe shoe has changed accordingly. Pointe dancers now spend a great deal more time on their actual toe tips than ever before. Thus the contradictory dilemma of a good shoe arises. The shoe must be simultaneously stronger and harder while being more comfortable. Of the toe shoes currently on the market, Freed's is, to me, the kindest to the foot. It is the softest and lightest, with less substance and less actual weight than other shoes, thus its life span is necessarily short. Yet if a dancer is comfortable, as she continues to dance she can rely less on the shoe (whose support has dwindled) and more on the

Toni Bentley took her first ballet lesson at age three. Her book, Winter Season, A Dancer's Journal, *has just been published in paperback by Vintage.*

Freed's toe shoe makes its pointe

Freed's stitching operator John Weston uses inside-out or turn-shoe method to join satin upper to the sole.

power in her own foot—a power that is considerable in a well-trained dancer.

A great part of the comfort lies in width. Unlike the 19th-century tubes perhaps only two inches wide, today's shoes come in many widths: narrow, regular, X(wide), double X and, recently, triple X. There has also been a widening of the shoe tip, which has caused a severe problem: in the very center of the flat tip where the pressure is the strongest on pointe, a softening, not unlike a hole, occurred after only a few minutes of wear. This led to the development of the "platform." The hard tips of Freed's shoes are formed from layers of satin burlap, brown paper and glue; the platform is an extra triangle of burlap added to the layering. This triangle, an inch on each side, has largely eliminated the weakness, and we can now dance without fear of the soft spot through which we could feel the stage far too intimately.

As a toe shoe begins its career, Kohler explained, it has a rapid but smooth progress into softness. With weight, work and sweat, the layering crumbles evenly to form cushioning for the toes. The length of time between a new, rock-hard pointe shoe (it feels and sounds very, very hard—like cement), which is noise- and blister-making, and its transformation into a soft, pliable cushion of padding, is very short. So Freed's has reached an acceptable compromise that favors the dancer while remaining esthetically correct—a compromise between hard and soft. It is these two terms that dancers use to describe their shoes. We have "soft"-shoe ballets with many jumps—Taglioni in *La Sylphide* —and "hard"-shoe ballets, the bravura ones, with fewer jumps but many pirouettes and bourrées—Patricia McBride in *Tarantella*.

The reluctant one percent: Who are they?

Why aren't toe shoes made from more lasting materials? Because leather, rubber, plastic and synthetics are loud, clumsy, painful and, most important, ugly. Freed's shoes, like the dancers who wear them, are beautiful, with a necessarily finite life span. "And you girls in the New York City Ballet use almost twice as many shoes a year as any other company," Kohler said accusingly. Then he winked; after all, it means more business for Freed's.

We are indeed a "Freed's company," with almost 99 percent of our shoes sent from London every year. (Kohler is still trying to find out who the few dissenters are.) We order approximately 50 pairs per girl, four times a year. The American Ballet Theater and the Royal Ballet order 60 pairs per girl, twice a year. "Suzanne Farrell orders over 350 pairs a year"—one a day—Kohler said.

He came to watch a NYCB class while we were in

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Bernard Kohler holds Margot Fonteyn's size-four shoes and jests: "I lost my hair in the service of ballet."

Author's "maker," Ron Boorman, glues layers of satin, paper and burlap to make hard block in toe of shoe.

London to try to see why we are so hard on our shoes. He noticed that, unlike the ABT or Royal Ballet dancers who follow a more traditional classical training, we tend to pounce onto our pointes. Less concerned with the development and display of the calf and ankle, and with the foot slowly "rolling up" onto pointe, we virtually jump onto our toes. I was reminded of Balanchine. "*Bang!*" he would shout. "Get there! What are you waiting for?" And he would clap his hands quickly and sharply. Kohler thought we were more dependent on the shoe for support than other dancers who strive to create the illusion that the shoe is merely part of the foot. Balanchine liked the shoe to look like a shoe—separate and clean, with shiny ribbons. He did not like us powdering the satin to achieve a more subtle onstage effect.

Special orders comprise 75 percent of Freed's production. If a dancer is not satisfied with her shoes, she will not wear them. With humility and earnestness, Kohler said, "We try to keep our ladies happy." But this is impossible. Both the ballerinas and shoes have their eccentricities, and to find a perfect match on any given day is rare. No two toe shoes are alike, and no two pairs are alike, even though crafted by the same maker. He too has his good and bad days. A finished shoe cannot be altered, so returned shoes are added to the stock shoes and sold in Freed's retail stores, which is why students can be found wearing Natalia Makarova's or Gelsey Kirkland's rejects.

The dancer's complaint is usually something minuscule—a vamp that appears too short or too long, an uneven shank or a heel cut too low—eighth-inch discrepancies, but enough to drive a fussy ballerina wild. We have varying degrees of tolerance—some dancers simply wear all their shoes despite slight problems, others sort out 20 pairs into "unwearable," "for rehearsal only" and "best"—for the performance. More often than not, returned shoes arrive with the statement that they "are just not right." Kohler shrugged and smiled: "You ladies are a funny bunch. Miss Fracci, bless her heart, is a lovely lady, but Oh, how she fusses over her shoes! Miss Park is the same." Freed's has an illustrious clientele, including Carla Fracci, Merle Park, Antoinette Sibley, Suzanne Farrell, Patricia McBride and Natalia Makarova.

Suzanne Farrell has worn only white shoes for the past few months. Doesn't she have any peach? "Yes, she does, lots of them, but she says she can't wear them," replied Kohler. Many of us, myself included, find the size and shape of white toe shoes invariably different from the peach. Kohler is again bewildered by this common complaint: "They are the same shoes, made by the same men, but I know you girls don't think so." He's right. And we're right. It's simply one more elusive idiosyncracy inherent in the toe shoe.

On the subject of pay and price, Kohler was discreet. The makers work without contracts or company pensions and are paid per pair of shoes. A maker who assembles 42 pairs each day will take home twice the pay of one who assembles 21. At Freed's London store, a pair of stock shoes costs £8.90 ($12.63 at the current exchange rate). At the New York store they cost $29. Special orders—for professional dancers—cost about $5 extra. The NYCB bill is close to $400,000 a year.

The surprising part of Freed's business is that for an enterprise of its scale, work is carried out with such individuality. Each maker is selected by each dancer according to her own needs and expectations. This is good old-fashioned country-store service. As dancers, we are each known by name, just as our makers are

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The author on pointe in silk chiffon; she became a member of the New York City Ballet company at 18.

known by their signature symbols imprinted on the bottom of each shoe.

"The men will be starting the afternoon work soon, and we can begin our tour," Kohler announced at a quarter to two. But first he wanted to explain an important toe-shoe tradition. They are made inside out and then turned for drying, shaping and cleaning. Turn-shoe making, as it is called, was the method used for all shoes until the 1870s. Today, street shoes are assembled right side out. Toe shoes and some running shoes are the main turn-shoes still being made; when they are reversed, there is a flat, smooth sole seam on the underside. Have they tried to make a toe shoe right side out? "Yes," nodded Kohler, "but it didn't work." Why not? He leaned back in his chair: "Well, shall we just say it wasn't a ballet shoe?"

At street level, in four large bays and several offices, lies the factory. Nineteen of Freed's makers work in one of these rooms. There are large skylights, and old-fashioned ceiling fans keep the air cool. Each maker has his own workbench with his name and personal

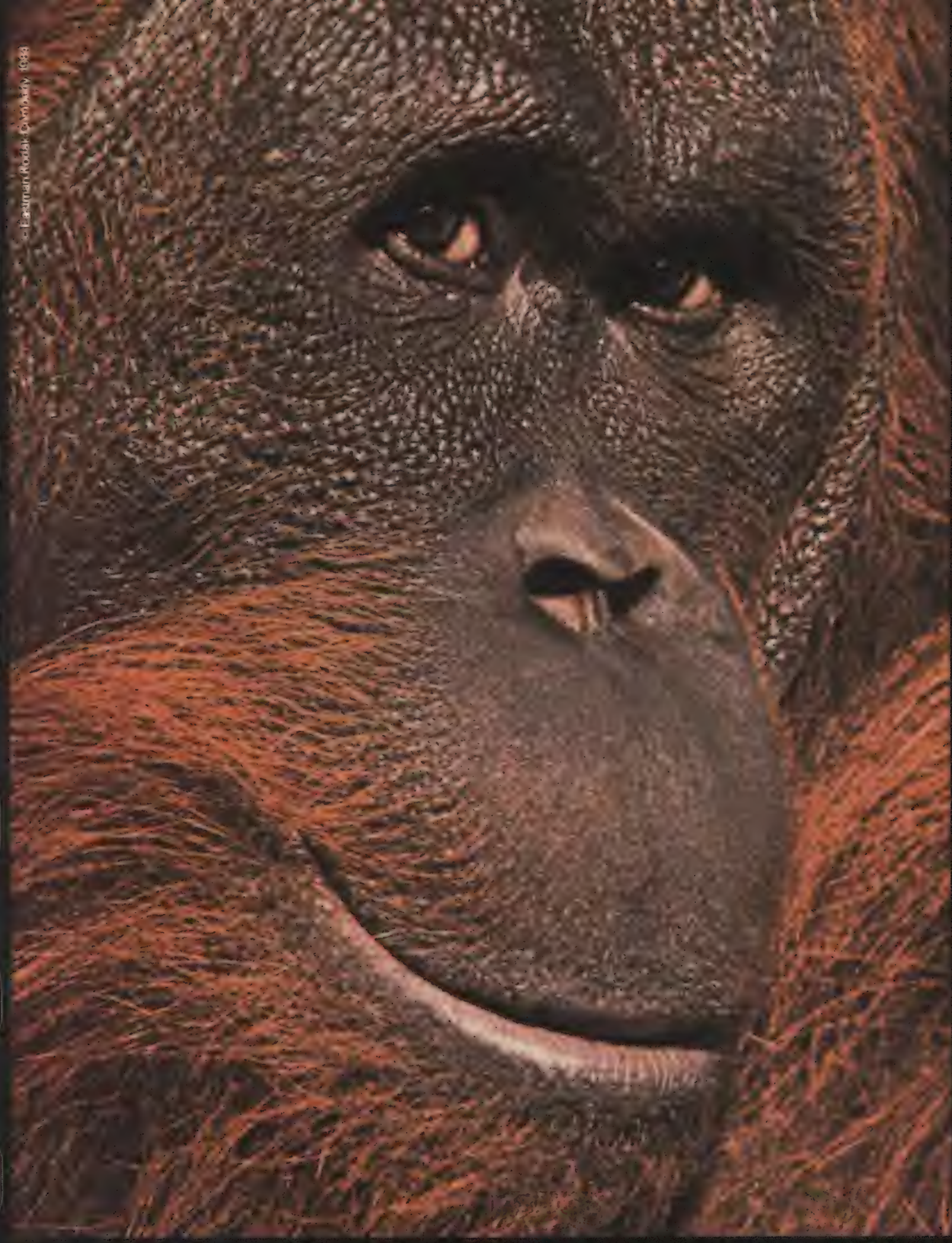
mementos—it reminded me of our dressing rooms, where each girl has her "place" with mirror, makeup shelves and theater case, and where we, too, sew our toe shoes, attaching elastic onto the heel and ribbons at the sides (the shoes don't come with pre-sewn ribbons so that each dancer can place them to suit herself).

My romantic vision of little old men like Dr. Coppélius, bent over, sewing shoes while dreaming of their lovely, far-off ballerinas, was quickly dispelled. Many of the makers are young or middle-aged, and they stand (*always* stand) at their workbenches. I asked if the men had photographs of ballerinas to inspire them. Kohler smiled again: "I think you'll find the men have other kinds of girls on their walls." Indeed they do. Pinups, belly dancers and provocative calendar art are where my wafting Giselles should be. The girls who have been taped haphazardly to the walls have never sported a toe shoe—or anything else.

Pushing and pulling toward the pointe

As the maker begins his work, his bench is already set up with the orders for that day and all the raw materials. "Making" is only a small part of the finished product. The other employees do what the maker does not. Initially, he matches the upper to the shank, pleats the toe and then shapes the shoe after the marking, measuring, cutting and stitching have been done by others. With his hands and various curved pushing and pulling instruments, he molds the still-soft block of paper, glue and burlap into its finished pointe—square, long, flat, oval and curved in all the right places. The shoes are then set to dry overnight in large ovens to preserve the shapes perfectly—until the dancer reshapes them before wearing. It is by their "shapes" that we know our makers, and it is their shapes that will win for them their "own dancers."

Entering the factory, I was struck by two things: the shoes, which are everywhere—40 pairs at a time stacked in four-foot-high cones of shiny silk—and the lasts. These are the heavy plastic molds around which each shoe is shaped. They are blue, green, brown and yellow, and there are 8,000 of them at Freed's. They resemble the idealized smooth, slim, elongated shape of a dancer's foot, and they give the Freed's shoe its distinctive shape. The natural foot lives and works inside a toe shoe that is molded to an ideal perfection; the bumps, lumps and angularities that a dancer's foot develops are the compensatory results. Were our feet as smooth and symmetrical as our lasts, we could emerge unscarred from our shoes. A last is a compromise, fashioned to have the hypothetical curve that lies somewhere between a dancer's flat foot and arched foot—two very different sizes and shapes, yet the same shoe must serve both.



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Because time goes by.

The women who inhabit the large room next to the makers perform the last stage in the birth of a toe shoe. It is one of the wonders of their skills that in just 30 seconds the "drawstring lady" can stitch the string and its casing to the edge of the satin shoe. At the heel end of the outside shank, Freed's famous trademark—two standing toe shoes—is pressed into the leather; the toe end gets a crisscross design to help prevent slipping. The name of the dancer is then written by hand on the shank. Kohler explained that because different-color pens are sometimes used to inscribe each shoe in a pair, dancers often complain that they did not receive a true pair. As all toe shoes are the "same"—there is no left or right—the dancer decides which shoe goes on which foot. The date of the shoe's birth is stamped on the shank to help in sorting out returned shoes and tracing complaints. Shoes are cleaned, bagged and sorted for shipping. The women's workroom is more bright and convivial than the makers'. Here there are no pinup girls but, instead, family snapshots and calendars with Princess Diana, Prince Charles and the Royal Baby.

As we leave the workrooms, great tubs of gooey pale-brown glue being mixed for tomorrow are churning in a corner. The floor is covered with leather shavings and little pieces of peach satin. What other factory has such dainty droppings?

Bernard Kohler and I get coffee from a machine and return to his office, which is decorated only with bags of unused old toe shoes—his museum. He sits before a desk covered with papers: orders, measurements, complaints. A single new shoe lies to his right. He opens a tin of tobacco, rolls a cigarette and seems pleased by my enthusiasm for what I have just seen in the factory. After all, at the very base of the ballet business is the toe shoe—and its maker.

It takes three years of training before a maker can expect to get his own dancers and a steady flow of orders. He may then work for 30 or more years—far longer than most ballerinas. I asked Kohler if he and the makers know or care that we deliberately mutilate our new shoes. He laughed. "Yes, we know what you girls do. . . ." He held his hands out helplessly and said, "This is our business. We make the shoes and you wear them." Do the makers know much about the ballet or who their dancers are? "Not really," he replied. "These men are more interested in Saturday-afternoon soccer."

My maker until two years ago was Mr. Y. We Y dancers were told that he was no longer working (we thought he had died, but he'd semiretired) and so we had to choose a new maker. Mine now signs his work with the playing-card symbol for the ace of spades.

Kohler then got up and from a shelf pulled down a dusty brown box. "Here's something you might appreciate." He took out an old unused pair of toe shoes. They were tiny—size four. The name on the shank was Fonteyn. "These are from her last order," he said. He told me that in her career of more than 40 years she

Students unaffectedly assume Dégas-like poses during break at New York's Harkness Center. Feet in the portrait are those of its founder, Rebekah Harkness.

had had three makers just as she had had three partners. The shoes still shone, and the blocks were as hard as the day they were made, only now little bugs had crept inside to feed on the dry glue. He shook out the bugs and put the shoes back in their box.

As we left the office, Kohler asked if I would like to talk to *my* maker. My heart jumped and I followed him. "Mr. Spade" was Ron Boorman, 25, slim, strong and handsome. He was also very shy. It was after 4 o'clock and he was finishing up his day's orders, placing them in one long row. Boorman is unusually successful for such a young maker, with many devoted customers like myself; he makes 36 pairs a day. I asked him if he had ever been to the ballet. He hadn't, but he'd seen a little on TV. I thanked him for making my toe shoes and enabling me to dance. He blushed and looked at the shoe in his hand, then thanked me for giving him my orders and enabling him to work.

Dad meets the graduate in his Peugeot

That night, when everyone else had gone upstairs to bed, they stayed out on the deck and talked. Just the two of them, father and daughter.

She told him how tough this last year at college had been, how dumb she had felt sometimes.

He told her about architecture and how dumb he still feels sometimes.

They agreed on bluegrass and spy thrillers. Agreed to disagree on Brahms and ice cream with walnuts in it.

They chuckled about her kid brother, the-boy-who-was-all-legs, and his recent discovery of girls.

They did not talk the way they used to talk, like father and daughter. Without noticing it, they had become friends.

"I like you," he said.

"I like you, Dad."

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The car that Dad took to the station is the new Peugeot 505 STI.

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comfort of body.

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PEUGEOT

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By Curt Suplee

Why do we weep? As yet, nobody can say for sure

Tears induced by exposure to films like *Brian's Song* are collected for study in a Minnesota research lab.

But today a genuine effort is being made both to make tears socially acceptable and to try to discover what use they serve

Alone among animals, man is the creature that weeps.

We weep in mourning. We weep for joy. When a man dies we weep. When a baby is born we weep, too, some of us, perhaps in homage to the miracle, as if each new life were a brave defiance of fate, perhaps moved by the helplessness of a creature soon to face life's thousand dreads and murderous indifference. We are brought to tears as well for reasons multitudinous and trivial. The sight of a sunset. The sound of a national anthem. Even because of a flat tire, a Beatles' concert, a broken washing machine.

Crying seems such a simple act. Instinctive as the beat of a pulse, spontaneous as a sigh. Yet in the moment of their coming, tears are a mystery. What do they mean? How and why do they come? Precisely what use do they serve? What, in fact, *are* these distillates of woe that, down through the ages, have linked men and women in the common salt not only of suffering but of joy?

In his *Confessions*, St. Augustine entreated God to tell him "why weeping is sweet to the miserable." God did not vouchsafe a reply, and today, 16 centuries later, modern science has no satisfactory answer either. All tears have a certain amount of salt in them (about .9 percent). Women cry more than men. Everybody knows that and the sciences, social and otherwise, confirm it, though not quite as universally as you would expect. But why do women cry more? Is it a matter of biology? Or sentimental conditioning? Or merely the difference in nose size, as one ingenious anthropologist contends (smaller nasal passages, less room for tears)?

Science can now distinguish physiologically between *reflex* tears (stirred, for example, by onions) and *emotional* tears (arising mainly from grief or joy). A Minnesota biochemist, William H. Frey II, who directs an ongoing study of tears, has established that emotional tears have a higher protein content than reflex tears. But neither Frey, nor anybody else, yet knows why, or of what use the protein-rich tears are to the weeper or to society in general.

One thing is clear. In myth and metaphor, in rites of mourning and rebirth, tears have always been deeply intermingled with the human heart and the history of mankind. In ancient Assyria weeping seems to have accompanied agrarian fertility rites, perhaps symbolically replacing rain crucial to crop growth, a practice alluded to, or so some Biblical students think, in Psalm 126: "They that sow in tears shall reap in joy."

Throughout the Old and New Testaments, the sacramental function of crying echoes steadily down from Job's "mine eye poureth out tears unto God," to Mary Magdalene's ritual washing of Jesus' feet with her tears in an act of humility and purification.

In Norse mythology tears can be more directly utilitarian, in one instance being used to illustrate condensation. When Odin's beloved son, Baldur the Good, dies, the gods strike a bargain with the giantess of hell that Baldur may be returned to the living if everything on Earth agrees to weep for him. "All things very willingly complied," says Bulfinch's translation, "both men and every other living being, as well as earths, and stones, and trees and metals, just as we have all seen these things weep when they are brought from a cold place to a hot one."

Most tearful legends are unrelentingly grim; for

Tears of deep mourning, wrung from a mother by death of her child, were portrayed by Charles Willson Peale.

Analyzing samples, William Frey submits tears to tests that help determine their protein content.

example, the classic Greek legend of lachrymosity is about Queen Niobe. Her tears, it is said, not only created a stream that runs to this day, but illustrated the dangers of being too proud of your children (and of boasting about them), thus tempting fate to take action. In Niobe's case, the gods killed all her children, and her grief-stricken husband took his own life.

The world has aptly been called "this vale of tears." Down through the ages oceans of tears have been shed. Yet since time immemorial people have had a hard time deciding (officially at least) whether to be *for* tears or *against* them. The debate still rages. Tears are good, runs one currently fashionable argument. They are a sign of humanity, softening and refining our perceptions of the world. They make us feel better. Tears are bad, goes the other line of thought. They destroy the control of reason. Shedding them in public makes us vulnerable, something few people can afford in this harsh world. Above all, though forgivable in women and children, they are highly suspect, not to say downright unworthy, when shed by men.

"I will not cry in the elevator!"

That view has been shifting. I recently heard of a young lawyer, well on her way to becoming a partner in her law firm, who suffered harsh criticism in her office. She wanted to cry but did not want to give her male colleagues the advantage of seeing her in tears. At lunchtime, still shaken, she rode down in the paneled elevator full of fellow lawyers, gritting her teeth and repeating to herself, "I will not cry in the elevator! I will not cry in the elevator!"

In view of such confusion of feeling and shortage of fact, it is not surprising that even a sage of Victorian sensibility like Alfred, Lord Tennyson, found lachrymosity perplexing: "Tears, idle tears, I know not what they mean,/Tears, from the depths of some divine despair/Rise in the heart, and gather in the eyes." Tennyson, of course, was talking about free-floating tearfulness, without evident cause (what Virgil called *lacrimae inanes,* "vain tears"). But the British poet laureate approved of tears. Being a late-19th-century romantic, he more or less had to. But approving of tears, idle or otherwise, for men at least, has been rare enough in England and America, as well as in many other places (and times) in world history. Two centuries earlier Tennyson's countryman, lumpish philosopher Thomas Hobbes, put forth the perennial view of tears when he wrote sneeringly, "They are most subject to [weeping] that rely principally on helps external, such as are women, and children."

Early science was not a lot of help to the tearful, either. In the 17th century, for instance, William Harvey, the first man to understand the heart and the

Crying as a Romantic cult: a woman painted this vision of how family would mourn after she was gone.

circulatory system, warned that yielding to strong emotion could disturb the heart rhythm, causing "vitiated nutrition and a want of native heat."

Somewhat later, Darwin speculated that when a baby cries the blood vessels of the eye become engorged and the surrounding muscles contract to protect it, thus triggering the lachrymal glands. In time, he wrote, "it has come to pass that suffering readily causes the secretion of tears," but he regarded the tears themselves as a purposeless by-product, not linked to evolutionary survival.

Anthropologist Ashley Montagu disagrees. He sees tears as having arisen in man precisely because the process of natural selection helped those who could produce tears to survive. "Even a short session of tearless crying in a young infant," he notes, "is likely to dry out the mucous membranes of the nose and throat, rendering the child vulnerable to the invasion of harmful bacteria and even viruses." Unless, that is, the membrane is soaked by lysozyme, an enzyme (discovered in 1922 by Alexander Fleming) that is secreted by tears. Whether they sobbed or not, "dry-eyed

Classic crier, Queen Niobe, wept copiously for her lost children and started a legendary stream in Greece.

babies," Montagu concludes, would have "less chance of surviving than those who cried with tears." In time, as humans evolved, "their responses to the weeping child increasingly sensitized them to the emotional behavior of their fellow humans."

Dry weeping? Oh, yes. In fact, says Alan Savitz, chairman of psychiatry at Washington, D.C.'s, Greater Southeast Community Hospital, "we don't even understand why children begin to have tears." Your average weepy human being, it turns out, is born without the ability to weep emotional tears at all. The skill doesn't develop until somewhere between the second and twelfth week of life (well before laughter, however, which does not arrive until about five months). Many scientists now suspect that weeping may be crucial to well-being. Studies show that infants with an illness that prevents them from producing tears with crying are unable to handle much emotional stress. Besides their extra protein, emotional tears are different from reflex tearing in other ways. They can appear, for example, even after the cranial nerve that controls reflex weeping is severed.

William Frey is the only scientist, so far, to concentrate heavily on the chemistry of emotional tears and the biochemical changes related to emotional states. For five years Frey and his colleagues have been collecting the emotional outpourings of hundreds of volunteers from Minneapolis and St. Paul, who are subjected to "four-handkerchief" movies to make them start weeping. (*Brian's Song*, a film about a young football player's death from cancer, was the most effective for many months, but lately it has been replaced as champion tearjerker by Jon Voight in *The Champ*, in which a boxer dies while his little boy looks on.) At first each subject was given special eyeglasses with little cups to catch the runoff. But, Frey notes, "they didn't fit everybody." Now he uses small test tubes (p.102).

For men, tears were long regarded permissible only if shed in emotionally overwhelming circumstances.

Such samples permitted Frey to establish the high-protein content of emotional tears. They also led him to a theory he has yet to prove, which is simply that tears, "like other excretory functions, remove from the body toxic substances that build up as a result of stress." Just exactly what substances, however, Frey doesn't yet know.

Inevitably Frey's studies have also moved off into human behavior. In 1982, he conducted the first study ever of adult crying behavior, a project that involved 331 people (45 men and 286 women). He found that the average duration of a crying session in both sexes was six minutes. Also, for women the number of crying episodes almost doubled during the heavy evening

Curt Suplee is a staff writer at the Washington Post. *His last article for* SMITHSONIAN *was an essay on the rites and wrongs of acquiring a computer.*

Here a soldier in Vietnam is comforted, perhaps struggling to control his grief at the loss of a friend.

rush hour of television drama (between 7 and 10 P.M.). It wasn't necessarily TV tragedy that did it, though. The women were at home at that time and likely to have emotional encounters.

Forty percent of female crying was over arguments, weddings, love affairs, all lumped under a broad Frey heading called "interpersonal relations." (Men cried over "interpersonal relations" only 36 percent of the time.) But a greater percentage of men (36 percent versus 27 percent of women) cried over movies, television and books. And, curiously enough, male crying was three percent greater in an ambiguous causal category labeled "sad thoughts."

The standard psychological view of tears today is that they help relieve emotional stress (a good thing). The corollary, which Frey puts rather modestly, is that "if crying relieves emotional stress," suppressing tears "may increase our susceptibility to a variety of physical and psychological problems." California sociologist and grief specialist Thomas Scheff, author of *Catharsis in Healing, Ritual and Drama*, is briefer—as well as reassuringly concise. Says he: "Crying is a necessary condition for removing sadness" and tears are "a necessary biological component." Stress expert Hans Selye says that failure to cope with emotional tension exacerbates such things as high blood pressure, gastric and duodenal ulcers, and certain types of rheumatic, allergic, cardiovascular and kidney diseases.

Wuthering Heights *on the late show*

If the current crop of experts who now point out that crying is not only a psychological comfort, but probably necessary to health and happiness, are right, the result of another of Frey's findings, though not surprising, seems to be gloomy news for men. For in Frey's study, women wept *four* times as often as men: 5.3 times per month in fact. And during any given month, only six percent of females reported no crying at all, versus 45 percent of males. (A corroboratory report published in *Ms.* magazine in 1980 noted that many women are "quite methodical about having a 'good cry,' actively choosing a time, place and the immediate stimulus to tears." These could be, *Ms.* reported, "an hour in the bathtub or a date with yourself to watch *Wuthering Heights* on the late show.")

According to Gordon Clanton, a sociologist at San Diego State University, emotional fashions in crying change over time, just like fashions in everything else. Periods of economic depression, Clanton feels, tend to cause emotional repression. Affluence, on the other hand, makes us more emotionally expressive, experimental and tolerant, as if, indeed, showing emotion were a luxury in which a society can rarely afford to indulge. As Clanton puts it: "Relative prosperity was the social precondition for emotional innovation and for outpourings of fashionable feelings among the classical Greeks of the fourth century B.C., the courtly lovers of Medieval France, the early 19th-century Romantics in England, and the hedonistic young Americans of the 1920s and late 1960s. And such innovation in the rules which shape emotional feeling and display often makes tears more acceptable."

In Western culture the principal antilachrymal arguments tended to come from the steadily evolving (and sometimes contradictory) demands of orthodox Christianity, plus the persistent force of Stoicism, and of Rationalism, with its belief that only by controlling emotion can society handle its problems reasonably. In their relentless logicality the ancient Stoics, for example, were indifferent to mythic precedent. "If Odysseus wept," arch-Stoic Epictetus groused in the second century A.D., "he was no good man. For how

Masculine shame at tears: skater Scott Hamilton hides eyes after weeping over 1984 Olympic Gold Medal.

can a man be good, when he knows not who he is, and how can he know this when he has forgotten that all things that have come into being are perishable?"

Similarly, the medieval Church had some rather special theological impediments to weeping, among them the doctrine known as *contemptus mundi*, which (like Epictetus but for different reasons) derided unseemly attachment to the transient things of this world. According to this doctrine, overt mourning of the dead tended to deny the hope of, as well as the glory of, resurrection. (Not surprisingly, actual tears are fairly rare in European art up through the early Renaissance, despite the endless torments, descents from the Cross and deaths of the Virgin depicted.)

Tears were equally uncongenial to the complacent deists of the Age of Reason. As early as the 17th century Locke warned, in his treatise on child rearing, that crying encourages "those passions, which it is our main business to subdue." Even Dr. Samuel Johnson, a kindhearted man, regarded excessive sorrow as "unprofitable." Seeing a friend's account of his mother's death, Johnson wrote him in 1750: ". . . tears are neither to *you* nor to *me* of any further use, when once the tribute of nature has been paid. The business of life summons us away from useless grief."

The great watershed in the history of approved tearfulness was the Romantic movement, which was based, in part, on belief in feeling (as opposed to reason) as a way to truth and virtue. In England especially, Romanticism made a popular cult of deep feeling and stirred an enthusiasm for moods thanatotic. Weeping came into vogue. Funereal black became the fashion in male clothing. Cemetery visits and reflections on mortality, foreshadowed in Thomas Gray's famous "Elegy Written in a Country Churchyard," provided *frissons* of feeling. By the early 1800s poet-essayist Leigh Hunt could advise about the death of children, "Where we feel that tears would relieve us, it is false philosophy to deny ourselves at least that first refreshment."

At least rhetorically, home was heaven

As the century progressed and bourgeois manners were grafted to Romantic notions, sentiment and sentimentality flowered. In extreme cases death came to be regarded as a welcome transport to serenity. Heaven, at least rhetorically, became a "home" where the deceased could wait to be reunited with loved ones, who, meanwhile, kept them present in proxy with "mourning pictures" (p. 105). Orthodox grief extended for a year and a day, during which widows wore "weeper cuffs," armbands worn as a sign of mourning.

In *Huckleberry Finn*, Mark Twain irreverently parodied both this obsession with death and the mourning-picture genre in his portrait of Emmeline Granger-

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At Italian wedding, fatherly tears are stirred by harrowing joys of giving daughter in marriage.

At a Junior Miss Pageant, tears of sisterly joy flow freely from contestant who has just won $1,000 prize.

ford, the morbid teenager whose uncommonly dark drawings and poetry are full of tombstones, weeping ladies clad in black, and inscriptions like "Shall I Never See Thee More Alas." (When she finally dies at 15, Huck is sorry, but concludes, "I reckoned that with her disposition, she was having a better time in the graveyard.") It scarcely seems accidental that the expression "crybaby" first entered the language around 1880.

Hardly more than three decades later, a century of cultivating tears and tender sentiments would suddenly exhaust itself in the trenches of World War I. And if emotional expression flourished again briefly in the rich and self-indulgent 1920s, the Great Depression and World War II, Clanton claims, "pretty much annihilated the playful emotional styles of the '20s."

In America, at least, passionate displays—tears included—would not be totally tolerable, even in women, until the first rock-and-roll splash of the late 1950s. The postwar baby boom was entering its teens. A vast hormonal stew of sweet pain, young lust and heartache inundated pop music with hot-eyed lamentation.

For one reason or another, America embarked not merely on a cultural revolution, Clanton says, but on a decade "much more expressive of a whole range of emotions from anger to delight." And if the nation has since retreated to a "cautious reassessment of that decade," there was, he says, "one lasting effect—men can show feelings." With the feminist movement demanding male "sensitivity" (of which tears are regarded as unimpeachable proof), men are actively encouraged to do so. The new lachrymosity reached some sort of peak with NFL behemoth Rosie Grier's 1972 rendering of the song "It's All Right To Cry" on the hit record *Free To Be You And Me*. "Crying gets the sad out," warbled Grier, and so on.

A decade that began with Ryan O'Neal in *Love Story* closed with Albert Finney in *Shoot the Moon* (plus ample leakage from the likes of Jon Voight, Richard Dreyfuss and even Sylvester Stallone as Rocky, the "Italian Stallion" of the boxing ring). Thanks in part to better theatrical weeping through chemistry, Shakespeare averred that if a boy "have not a woman's gift/ To rain a shower of commanded tears,/An onion will do well for such a shift." Today's makeup men use a tiny blower filled with menthol crystals. For subsequent shots the natural tear tracks are duplicated with glycerin. Still, says veteran Hollywood makeup man Howard Smit, "We tell 'em to drink water like gangbusters. Sustain that crying for a day and these people are wrung out."

There are signs that public acceptance of tears, in men at least, is in decline again. It is probably significant that for the first time since the 1950s the word "wimp" is back in currency. A resurgent patriotism is reviving public regard for stoic military bearing. As Frey's sampling shows, these days men don't appear to be pulling their lachrymal weight anymore. And to make matters worse, some of their tears may not even be genuine. Says Suzanne Braun Levine, managing editor of *Ms.*: "There are some fake-sensitive men out there," who use crying as a sexual come-on for liberated women. "But they're crocodile tears."

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Lawyer Hepburn's outpouring in *Adam's Rib* is dismissed by her fellow-lawyer Tracy as "the old juice."

Antipollution poster in 1972 capitalized on Indian reputation for stoicism. Tear was glycerin drop.

Despite bad word of mouth about crying, it was always more or less permissible for tears to be wrung from men by great grief—though anything that could properly "make strong men weep," as the traditional phrase goes, was supposed to be pretty overwhelming.

When Patroclus was slain before the walls of Troy, the great Achilles' very horses wept. As for their master, as arrogant and coldhearted a sacker of cities as history or mythology provides, he not only wept, but picked up the dark dust in both his hands and poured it on his head, and "cast himself down on the earth." Shakespeare's Laertes is deeply ashamed but he, too, weeps over his drowned sister in *Hamlet*, opining, "Nature her custom holds,/Let shame say what it will. When these [tears] are gone,/The woman will be out."

Tears could ruin a political career

The special conventions controlling what tears are acceptable and what tears are not have often been inconsistent. Even before the latest campaign to make crying safe for red-blooded American males, nobody seemed to think the worse of a 220-pound football player who wept openly after his team lost the Super Bowl. Yet what has never been officially approved of in men is tears shed in response to transient frustrations or mere adversity, and as late as 1972 tearfulness in the wrong circumstances could ruin a male political career. Senator Edmund Muskie lost his bid for the presidential nomination at least in part because the spectacle of the manly candidate apparently weeping, over harsh words from a right-wing newspaper attacking his wife, was too much for the voters.

By associating tears with "weakness," and weakness with women, men like Laertes and the antitear forces have, in an odd, backhanded way, encouraged tearfulness in the human female. (It was no coincidence that witches, regarded as unwomanly daughters of beguiled Eve, collaborators with the Devil, were considered incapable of weeping.) In *Malleas Maleficarum*, the famous antiwitchcraft handbook from 1490, the ability to shed tears is regarded as a test for women accused of being witches. Judges are urged to try to make these women cry, adjuring them to do so by the "tears shed on the Cross by our Saviour, the Lord Jesus Christ."

According to some men, at least, women have license to cry at virtually any contingency, not only as an emotive birthright of the "weaker sex," but also as a compensatory mode of aggression. In the long skirmish between the sexes, tears have been represented as a mighty female weapon. A disaffected John Donne (one of the world's greatest love poets, as well as a Protestant minister) warned 400 years ago that "hearts do not in eyes shine,/Nor can you more judge womans thoughts by teares,/Than by her shadow, what she weares." Yet

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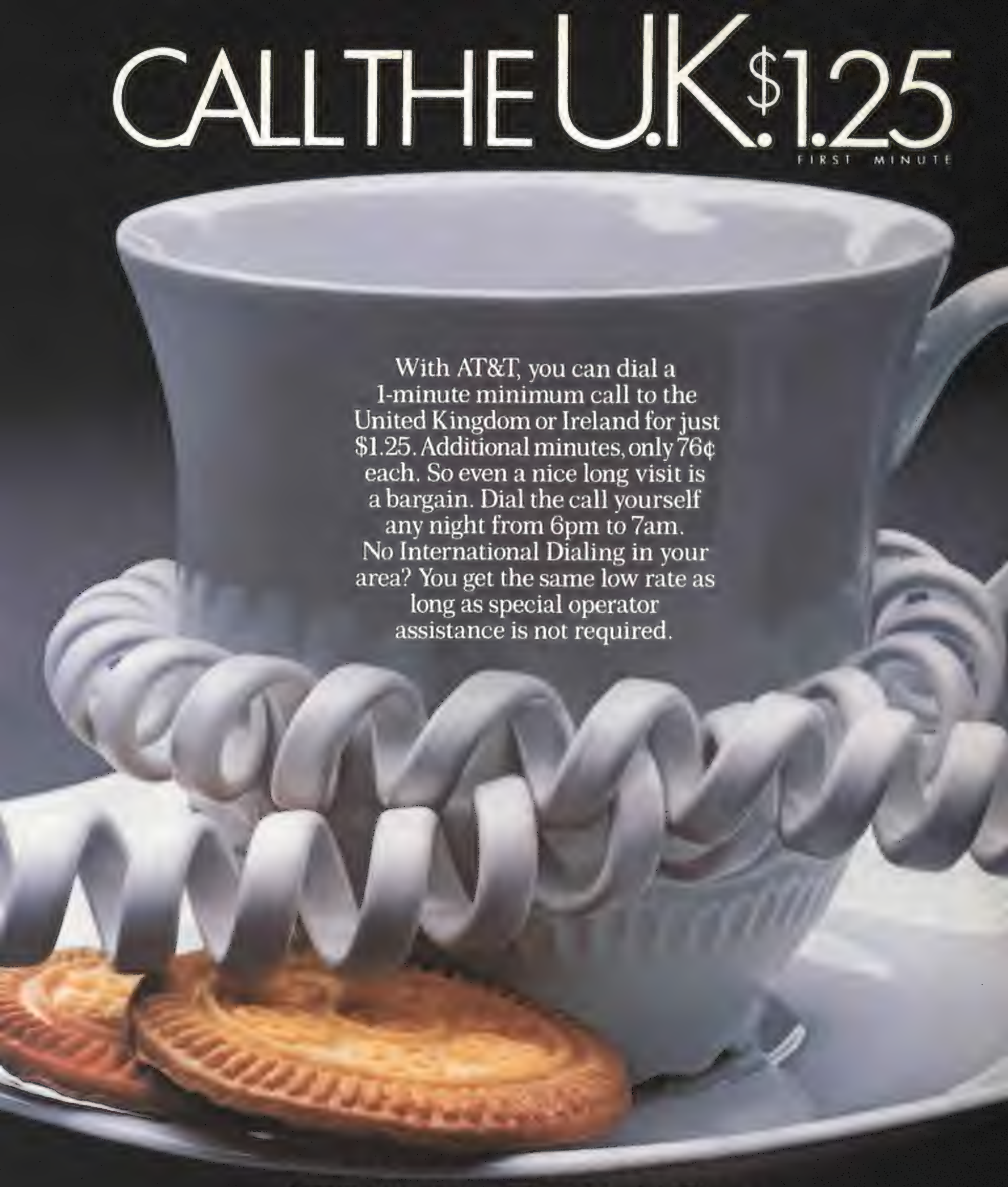

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in life as in fiction, the manliest specimens have regularly been reduced to gibbering helplessness at the sight of a loved woman weeping.

Until quite recently, that kind of emotional leverage was nowhere more frequently or blatantly invoked than in the movies. Even the strongest female characters, like Katharine Hepburn in *Adam's Rib* (in which she plays a successful lawyer), are often accused of possibly unscrupulous use of what in the film Spencer Tracy calls "the old juice," simply to get their own way.

One thing is clear. Until researchers like William Frey learn what tears do, and what use that extra protein in emotional tears serves, as well as where it comes from—or until women are quite unsexed and men are made of stone—nothing will be certain but death, tears and taxes. As Byron wrote: "Away! we know that tears are vain,/That Death nor heeds nor hears distress:/Will this unteach us to complain?/Or make one mourner weep the less?/And thou, who tell'st me to forget,/Thy looks are wan, thine eyes are wet."

Somewhat self-conscious weeping is demonstrated in *Crying Girl*, a 1964 painting by Roy Lichtenstein.

Studies suggest that women not only cry more than men, but often regularly set aside time for a "good cry."

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In time exposure of night flight on Mall, boomerang with tiny light appears to encircle the Capitol's dome.

By Stephen S. Hall

Boom in 'rangs launches old toy into new orbit

It's a throwback to Aboriginal times Down Under, but now the trusty boomerang is delivering many happy returns up here, too

Spinning vertically at launch, it shifts to horizontal plane around midpoint of its journey back to thrower.

It's hard not to admire a piece of wood that can find its own way home. That, of course, is what a boomerang does when it is launched in the proper way. In due course, after a spectacular flight of some considerable distance, it returns to the hand that released it. Exactly what is accomplished by the exercise is unclear, but this much is certain: throwing a boomerang is fun.

Boomerangs are, without a doubt, the most utterly useless, intellectually satisfying objects ever devised by Stone Age minds for 20th-century appreciation. From the point of view of aerodynamics, kinetic poetry or pure recreation, they are marvelous flying machines.

Many people associate the boomerang with Australia's Aboriginals, and rightly so. In modern times, however, boomeranging's popularity has been pretty much limited Down Under to certain roving bands of fanatics like the Mudgeeraba Creek Emu Riding and Boomerang Throwing Association. Several years ago, in fact, a dozen American boomerangers actually beat the Australians on their own turf in three straight challenge matches. In the nationalistic media laments that ensued—"It should never have been allowed to

Photographs by Peter Thomann

The boomerang's happy return

Boomerang booster Ruhe prizes Aboriginal throw sticks (top row to left of him) in his own collection.

happen," grumbled the Sydney *Daily Telegraph*—the sport received the kind of attention it had not seen since the day in 1954 when an Aboriginal named Joe Timbery, in a command performance for Queen Elizabeth II at Wagga Wagga in New South Wales, fired ten boomerangs into the air at once. Now the Aussies are getting their shot at revenge. A six-man team chosen by the Boomerang Association of Australia will be making a challenge-cup tour of the United States early this month with matches in Washington, D.C.; Bethlehem, Pennsylvania; and Delaware, Ohio.

Presumably the challengers have trained hard, but they're in for a tough fight because Americans are quite serious about boomeranging these days. In fact, it's probably safe to say that this wacky pastime could be well on its way to becoming the nation's latest fair-weather fad. The United States Boomerang Association, headquartered in Richmond, Virginia, claims only 275 members, but a Wisconsin mail-order house, Lands' End, has sold more than 25,000 boomerangs since it began advertising them in 1982; and now Wham-O, the California company that brought you the Frisbee, is bringing you the Wham-O-Rang. "Boomeranging is the fat man's sport," says Alison Fujino-Miller of Seattle, president of the USBA. "The better you get, the less you have to move."

No one can say for sure why the boomerang was invented, but the general assumption is that it was originally used as a weapon. The returning boomerang as we know it is the ballistic sibling of a nonreturning device known as the "throw stick." Archaeologists unearthed throw sticks in King Tut's tomb, for example, and variations were used by ancient cultures in such disparate locales as the American Southwest, northern Europe and India. The Australian Aboriginal model, which also goes by the name of "killer stick," was carved out of hardwoods such as acacia. It was about three feet long, had a gentle bananalike curve and was relatively flat. Heaved sidearm, the killer stick could travel in a straight line for distances of up to 200 yards. It packed a big enough wallop to dispatch a kangaroo or an emu, but it didn't come back.

Wooden fragments recovered from the Wyrie Swamp, southwest of Adelaide, have been dated back at least 10,000 years, and their shape and location suggest that they were *returning* boomerangs. "They may have been used as scare devices to drive water birds into nets," says Ben Ruhe (above) of Washington, D.C., a former Smithsonian official who is generally recognized as the leading historian of the American boomerang movement.

The British explorer Capt. James Cook made what may be the earliest documentation of the

New York City writer Stephen S. Hall threw many boomerangs while doing research for this article. He is still waiting for several of them to come back.

Tomahawk, pinwheel and other modern versions are manufactured of plastics, plywood and other materials.

boomerang's use. When he dropped anchor in 1770 at Botany Bay, the flora-rich inlet just south of what is now Sydney, he observed the local Aboriginals throwing "wooden weapons." The first white settlers in Australia apparently heard one particular word—"bouma-rang"—used to describe the devices.

Although the early returning boomerangs may indeed have been used as weapons, it is hard to square that theory with the fact that they were much smaller and lighter than killer sticks, and therefore generated only a fraction of the impact. Given the playful nature of Australia's Aboriginals, moreover, it's possible that returning boomerangs never really amounted to much more than toys. The word toy, however, doesn't do justice to this object's aerodynamic complexities.

"Someone once said that analyzing the flight of a boomerang is more difficult than analyzing a flight to the moon and back," says Rusty Harding, a boomerang manufacturer in Lebanon, Tennessee. "And it's true." Harding, it should be pointed out, is no pie-eyed poet rhapsodizing about the "magic" of boomerangs. He has worked as an aerospace project engineer on aircraft like the Boeing 747 and designed control systems for Minuteman missiles. With the boomerang, he says, "the variables affecting its flight are more complex."

The question most frequently asked about boomerangs is simple: how do they work? The answers most frequently given are not simple. They include Newton's laws of motion, lift, gyroscopic stability, precession and magic—though not necessarily in that order.

The object itself has as many dips and curves as a fingerprint. Your basic returning boomerang measures 15 to 18 inches from tip to tip, spreads its arms at a 70- to 110-degree angle, weighs only about three and a half ounces, and is usually fashioned out of aircraft plywood. Shape is no object; enthusiasts have made successful boomerangs in the form of most letters of the alphabet, and some innovators are now trying to prove that even Chinese characters are aerodynamic. Harding handcrafts more than 5,000 boomerangs a year in his workshop, including one in the shape of a tomahawk. "Remember," he warns purchasers, "while you are the thrower, you are also the target."

The same basic principle of lift that governs the flight of the airplane also operates in the flight of the boomerang. Almost any wing-shaped object with a flat bottom and a convex top generates lift when it moves through the air. You could view a jetliner's pair of wings as forming the classic shape of a boomerang, but with one crucial difference. On the airplane, both wings have their leading edges—the blunt, highly curved part of the wing—pointing forward into the air-

Freshly painted boomerangs hang outside to dry at aerospace engineer Rusty Harding's home workshop.

As 'rang comes in at a hover, Louisiana enthusiast Richard Harrison assays a two-handed sandwich catch.

flow. On the boomerang, one of the two blades has its leading edge pointing "backward" and this introduces a new aerodynamic wrinkle.

The boomerang—or 'rang, as it is more familiarly known—is launched vertically. If you are a right-hander, you hold the object in a pinch grip with the flat side away from your body. You bring your arm forward with a snapping motion, not unlike throwing an overhand pitch in baseball. Sidearm deliveries are a no-no; they generate too much lift, so that the boomerang climbs steeply, stalls, then hurtles toward splinterdom. As it leaves your hand, the average boomerang is traveling 45 to 55 miles an hour, spinning end over end ten times a second. Quickly, beautifully, it begins a majestic elliptical climb into the sky.

Then something very strange happens and, in order to understand it, forget boomerangs and think of bicycles instead. When you ride a bicycle with no hands, you can compel the spinning front wheel to turn left by leaning left. You create, in effect, a destabilizing top-heavy force in a downward direction, and the wheel then turns left to adjust to this disturbance and restore stability. If the bike is stationary, of course you topple over. But as long as the wheel is spinning, gyroscopic stability can come into play.

A similar disturbing force acts on the boomerang. This is due to a fascinating fact: boomerang blades travel at two different speeds at the same time. The blade at the top of rotation represents the sum of two separate forward velocities: the forward thrust provided by your arm, and the forward slash of the spinning arm of the boomerang. The blade at the bottom, however, is actually slashing backward, toward the thrower, so one speed subtracts from the other and the overall velocity is much less.

The discrepancy in speed—fast on top, slow on the bottom—creates the same top-heavy pressure in a spinning boomerang as you exert on your spinning bicycle wheel, and so the 'rang, too, turns left to maintain stability. The sum of all these leftward turns is a great lazy circle that sends the boomerang scooting back to your waiting hands. One of the most remarkable things about a boomerang flight is that you can actually see these tiny adjustments take place. The 'rang appears to tune itself to the onrushing air. It trembles toward aerodynamic fitness. As it completes this long turn, the boomerang also "lies down." Whereas at launch it was spinning vertically, it slowly settles into a horizontal spin, like a helicopter blade, and drops out of the sky as softly as a seedling from a maple tree.

Aerodynamicists and physicists have sweated over slide rules and computers, trying to make sense out of all the composite forces acting on the boomerang. The Dutch physicist Felix Hess, a legendary theorist in boomerang circles, spent seven years writing a 555-page doctoral dissertation on the flight of the boomerang. Contemporary craftsmen don't necessarily understand all of the new knowledge about drag and lift, angular-momentum vectors and moments of inertia, but they are probably turning out the best boomerangs ever made anyway. Doug DuFresne's "Oregon Hat" is easy to catch. Eric Darnell's "Vermont Windcheater" flies well in a stiff breeze. The "Zanzibar," an experimental number engineered by Richard Ruhe, Ben's nephew, is designed to stay aloft for more than half a minute. (A "normal" flight rarely exceeds 12 seconds.) From overseas come Bob Burwell's "Wanderer" (Australia), Lorin Hawes' "Silky Spinner" (Australia), Jacques Thomas' "Le Grand Rouge" (France) and Willi Urban's nylon "Comeback" (Germany).

Frank Donnellan: boomeranger to the core

For every scientific explanation of boomerang flight, there is an anecdote about some legendary thrower of the past. One of the greatest was the late Frank Donnellan, a Sydney printer. In the 1930s, he would throw boomerangs out over theater audiences while blindfolded and, according to the stories, make flawless catches. Some say he even invented the "William Tell trick" (pp. 124-25), which requires a daredevil thrower to place an apple on the head, let fly with a 'rang and "slice" the apple in half on its return. (This stunt has occasioned an increasingly common injury known as "William Tell forehead.") Donnellan also claimed to have thrown a boomerang out of one window of his car and caught it coming in the other.

The current American boomerang boom seems to date from 1969, when Ben Ruhe—smitten with 'rang fever during a 1950s sojourn in Australia—convinced

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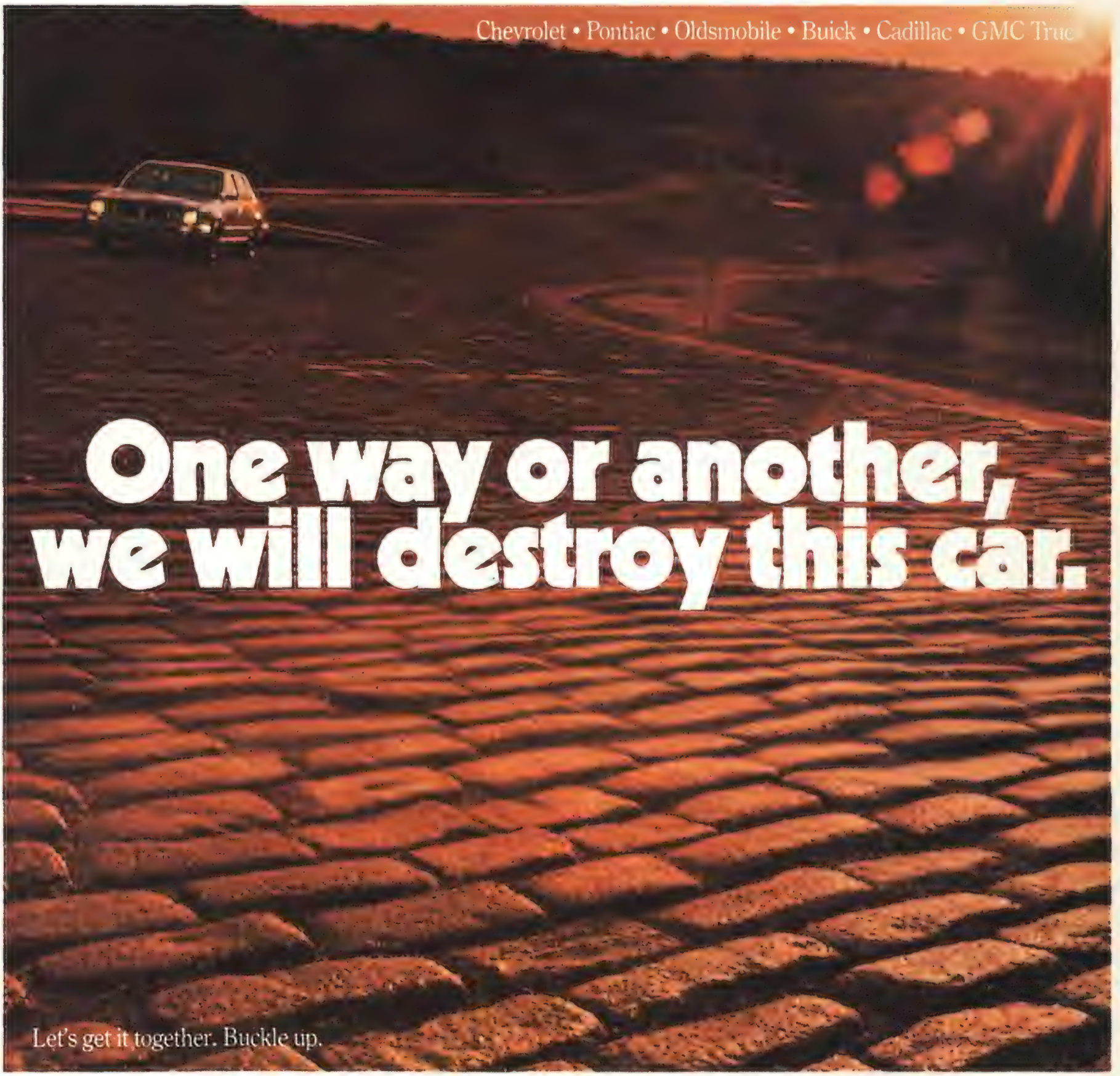
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the Smithsonian to hold its first boomerang "open" on the Mall. What other sporting event could legitimately bestow the "General Douglas MacArthur 'I Shall Return' Award" for general excellence? Since then, boomeranging has grown steadily into one of those good-humored, indefatigably obsessive subcultures given to inside jokes, bad puns and outrageous feats.

Perhaps the most outrageous boomerang feet of all time belonged to the aforementioned Aussie Joe Timbery, who was the first to popularize the barefoot catch. In a celebrated 1983 stunt, Richard Ruhe got off a toss that ventured out over Niagara Falls, violated Canadian airspace and returned to the United States before being picked up on foreign radar. The current phenomenon in the field is Baby Ben, the grandson of Australian champion Bunny Read. Baby Ben won an Australian national championship for junior accuracy throwing in 1982 when he was two and a half years old. Last year, he and his family amazed American audiences when they toured the country billed as the Bunny and Baby Ben Boomerang Barnstormers.

Boomerangers seem to be getting increasingly competitive. Contests are becoming commonplace all across the country. Typical categories include the long-distance throw with return, MTA (maximum time aloft), juggling (keeping one of several 'rangs in the air at all times), doubling (throwing two at the same time and then catching both of them) and accuracy. But, with apologies to the competitors, the most satisfying event of all for most spectators is simply the flight of the boomerang itself. Each launch is a confirmation of this simple truth: boomerangs are beautiful to watch.

Last January, five hardy souls—including four members of the boomerang-batty Ruhe clan—gathered just before sunset on a winter day at an open field not far from Dulles International Airport in northern Virginia. They came, of course, to hurl boomerangs. Low-flying airplanes crisscrossed the sky, and one couldn't help thinking that the engineers at Boeing and McDonnell Douglas had nothing on the prehistoric craftsmen who dreamed up this devilishly sophisticated aerodynamic gimcrack many millennia ago.

There may be safer ways to slice fruit, but world-class boomerang competitor Eric Darnell does it his way. To heighten the effect of William Tell stunt, Darnell halved apple and pinned it back together before throw.

At one point Ben Ruhe yelled, "Let's do a suicide—choose your weapon!" The five throwers quickly snatched up their 'rangs, and Ruhe cried, "OK, everybody in a line . . . one, two, *three*. . . ." And as the sun disappeared from the blue winter sky, five boomerangs simultaneously bit into a tricky wind. The blades beat against the dark air, twitching and turning like bats until, in a confused "suicide" scramble, everybody dashed to catch his arriving boomerang before it hit the ground. Almost everybody. One of the boomerangs died halfway out, in an abrupt parabola of doom, and broke in two. "Just a piece of wood," said Ruhe.

And so it is—just a piece of wood, with a twist here, a bevel there, an aptitude for making something out of air. Still, it is a wonderful invention that starts out in one spot, faithfully returns, and makes a lovely flight of fancy in between. It's hard not to admire a piece of wood that can find its own way home.

By Bennett Schiff

A fantasy garden by Nek Chand flourishes in India

The sculptor with his mosaic Garden of Eden; the design could be Roman, the figures could be African.

With industrial waste and anything else that's at hand, a visionary genius builds an epic sculpture kingdom, with acres more to come

Just outside the tightly contained borders of Chandigarh, the brand-new and already seedy provincial capital of the Punjab and Haryana, lies an enchanted sculpture garden made mainly from what was left over. And, although the city is the work of the French visionary architect Le Corbusier and the garden is the work of an untutored former road worker, it is already clear that the garden is by far the greater addition to the Indian landscape, a shining work of the imagination that should be added to the growing list of the world's wonders.

Chandigarh was Nehru's dream city, designed to replace Lahore as the capital of the Punjab after the partition of India and Pakistan in 1947 placed Lahore in Pakistan. It was to be a planned city incorporating the best of city, social, economic and architectural design (SMITHSONIAN, June 1972), and in Le Corbusier India obtained the services of one of the century's leading avant-garde theoreticians—with a dash of medieval-moderne thrown in.

The city, now about 30 years old with a population of 450,000 and still under construction, seems to have come out of Mondrian's geometric, rectilinear works. Unfortunately, the idea is better than the execution, Indian construction standards and technology, as they energetically modernize themselves, not being up to the exquisite and lasting craft that went into the great temples, palaces and mausoleums of many centuries ago. So, most structures are shabby, the concrete cracked, the iron rusting. They are already prematurely aged. What saves them is the pleasant counterpoint of the green fields of the fertile valley and the nearby Himalayan foothills, which would be mountains in any other part of the world.

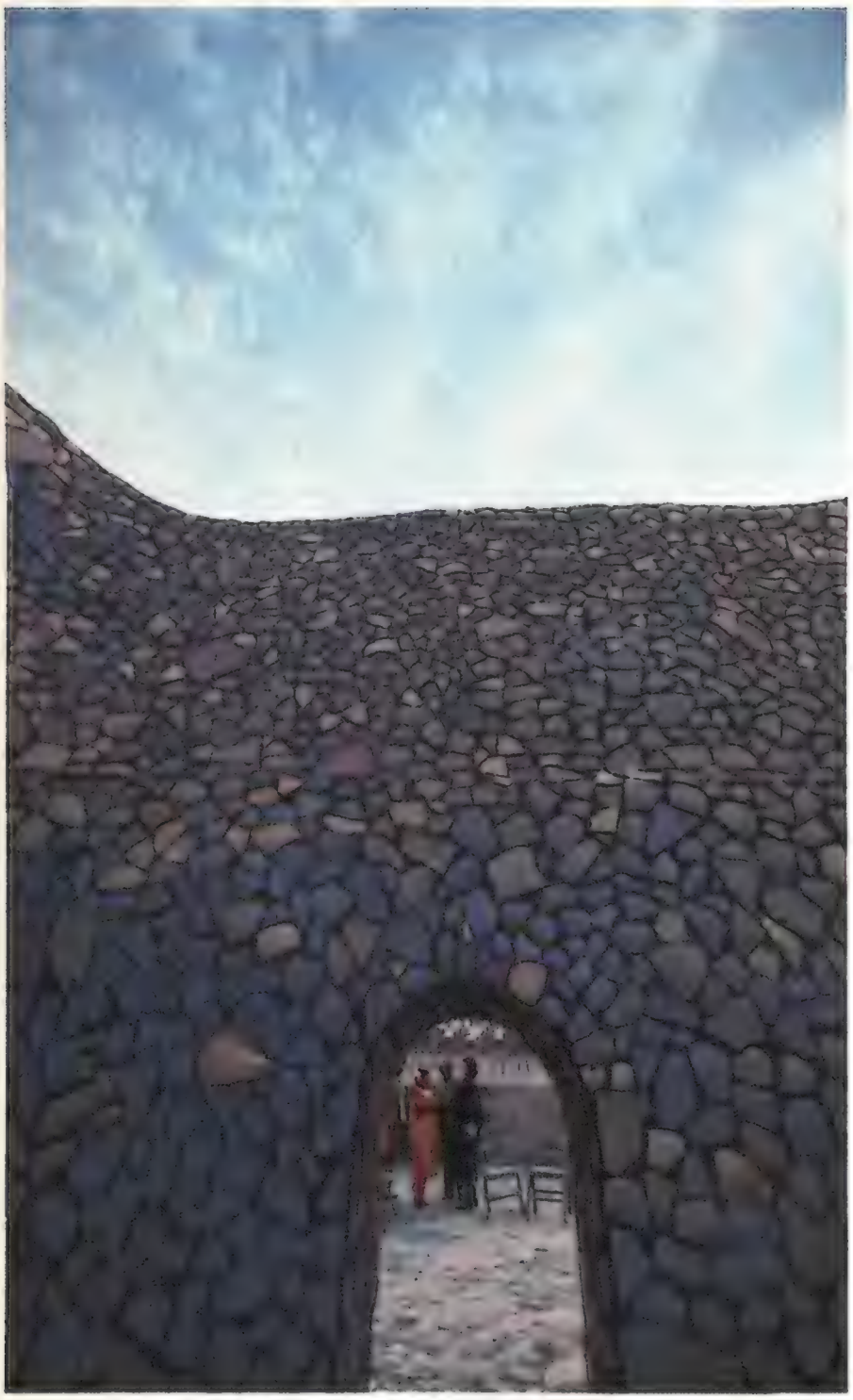
A mystical battalion of scintillating figures, one of many groupings, stands at attention in a courtyard.

So that nothing extraneous would intrude into the planned city, a buffer zone of hilly scrubland, made seasonally marshy by the annual monsoon, separates the city from its surroundings. It is a tract infested with mosquitoes in a country in which malaria is a considerable problem, and one most hospitable to cobras. In this desolate and dangerous place Nek Chand's garden grew and grows, covering 12 acres with 38 to go.

Nek Chand came to Chandigarh in the 1950s. Then in his mid-30s (he is now 59), he had been working as a menial laborer for the public works department of New Delhi, but the Punjab was home to him. He was born in the Gurdaspur district in the village of Berian Kalan, a gathering of 50 mud huts. The partition of 1947 which placed his village in Pakistan had sent him off to New Delhi, but in Chandigarh he was in home territory and he began to make real a dream he had: quite simply, to build a kingdom as an offering to the gods and goddesses of the world. It was, he says, "a secret, sacred trust."

He has been at work—if you count his first collecting forays into the countryside—keeping his vow for 26 years. "I have no theories about art," he says, perhaps not for the first time. "It comes from my heart and my imagination. I am not a ritualist; I carry God in my

Photographs by Robert Heiderer and Janet Kastelic



Thousands of shards of porcelain make an entrancing wall. Doorway is low to create reverential posture.

Serpentine walls encircle a circuitous system of courtyards, each with its own population of figures.

heart and when I pass a shrine I bow. I remember God all the time. All the gods of the world are my gods. Whatever I do it is not in keeping with any design. I work by intuition and inspiration. I wanted to build a holy place where the universal meaning of all gods, Jehovah and Christ, Buddha and Lord Krishna, is respected."

After he came to work in Chandigarh, he was put in charge of a warehouse and dump on the land which is now his garden. At night and on weekends, on many arduous journeys into the foothills and mountains nearby, and not so near, he began to collect the odds and ends and the stones, rocks and boulders which were his building materials. He and his wife built an illicit hut in the desolate strip as a workshop. They fought mosquitoes by burning castoff truck tires and covering themselves with burlap sacking. They managed the cobras, they began to plant flowers, trees and shrubs. The years went by; it took 18 of them to complete the first six acres. In time, Nek Chand managed to get the city dump trucks to come and dispose of their waste right at the site he had chosen. The garbage came to him, and out of the garbage he built a garden

Every one of the courts has an identifying theme: chimerical animals, soldiers, dancing girls, mystery.

inhabited by whole societies: populations of gods, goddesses, ministers, officials, children, dogs, cats, camels, deer, the animal kingdom.

A massive wall now encircles the complex, a wall that might contain a medieval fortress. It is about 12 feet high, made of layers upon layers of discarded coal-tar drums disguised by a thick coating of cement, so that the wall is at once formidable and magisterially decorative. A section of the wall swings open—a huge door—and you are in a different and unique world of magic, a place in which the Mad Hatter would be just another figure, for this is an immense Wonderland.

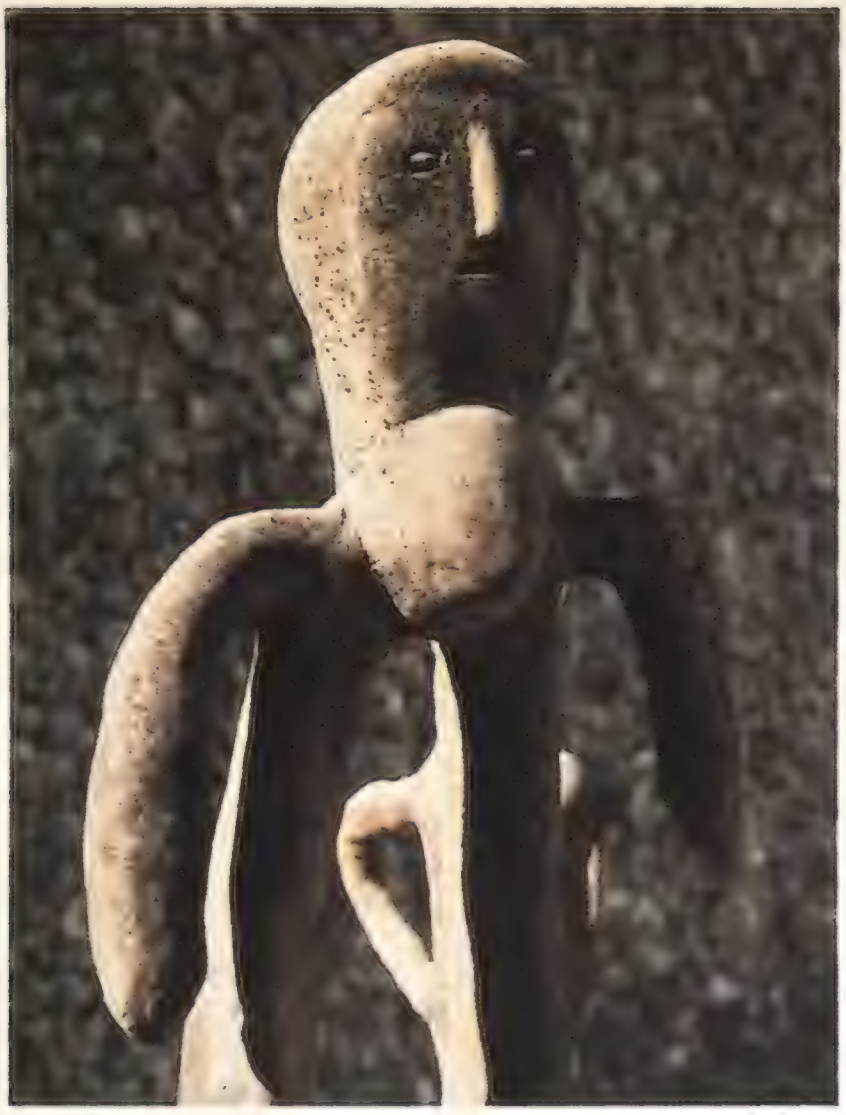
In direct contrast to Le Corbusier's design, which is largely a rectilinear aggregation of sectors and boxlike buildings, Nek Chand's creation does not have a straight line in it. It is completely curvilinear. It dips and undulates, and on all sides, on platforms and ledges, stand scintillating creatures from six inches to six feet in height.

The first six acres of garden contain a series of walks which lead through low archways into courtyards, each containing a different society peopled by inhabitants made of junk so ingeniously contrived and em-

Imagery is both eclectic and unique. This imposing face suggests that of ancient Buddha from Angkor Wat.

Dynasty of predatory dragons from another world looms menacingly on landscape of industrial detritus.

Straight out of Arabian Nights, splendid band of stuffed, bedizened warriors makes a dramatic display.



A plastic Kewpie-doll face casts a questioning look at passersby—but does not proffer any answers.

Ancient idol? Modern sculpture? Sci-fi figure? All or any, it's part of Nek Chand's "offering to the gods."

bellished that only after a hint can you discern that they have been fashioned from bicycle frames, seats, wall plugs, electric fixtures, fluorescent tubing or cast-off debris from a foundry. The archways are low, admitting no one taller than a child to enter without stooping. It is a holy place and it is seemly that one should bow when entering each area, Nek Chand informs you, although you have already felt it.

There is a place for a king to grant audiences, a bathing pool for a queen, a harem section. There are sheep made with the help of ladies' bicycle frames, cattle born of tricycle frames, folk romances of boys and girls made of broken clay water jugs. There is also a whole population of queens with real hair swept up from village haircutters' shops and now bleached a fiery reddish blonde by the strong and relentless sun (today is premonsoonal and so the temperature is only about 105 degrees, but it is humid). The colors are both natural, from the earth, and artificial, from the factory, so there is a dazzling and a restful variety. Pink, yellow, green and blue bathroom porcelain—of that particularly garish hue which characterizes it—is here in thousands of shards of every shape and size, applied to the great walls. It has never looked so decorative and graceful before, nor so permanent.

And, there is something else extraordinary about the entire place, all 12 acres of it—it is made of nonbiodegradable materials. While modern Chandigarh is falling down, these works may last for centuries.

Suddenly you enter a court inhabited by Satan and his followers. All look appropriately evil; there is an air of reality about this particular fantasy that makes you uneasy. It is refreshing to come upon dozens of figures made of coruscating bits of glass coated with soda-pop-bottle caps, a wall made of parallel layers of dead fluorescent-light tubes. Everywhere there are figures made of natural rock—from stones the size of marbles to more-than-man-size boulders—all of them suggesting beings with strong spiritualistic or animistic meaning. Nek Chand has been collecting them for decades and they form an elemental and decorative frieze throughout the complex. How many? He shrugs. But S. S. Bhatti, principal of the College of Architecture of Chandigarh's Panjab University, has written a graduate thesis on the garden (he worked on it for more than three years). He says, conservatively, at least 20,000 figures.

You know and feel that these thousands of mythic figures, the stones in strange and yet familiar shapes, are in some mystical way what Nek Chand wants the respect of. He is their creator, but in an odd way he is their fellow creature. And he is their subject, too.

When Bhatti began his study of the garden, he tells you, "people who heard of it thought I was joking.

Bennett Schiff, a former New York art critic, is a member of SMITHSONIAN*'s Board of Editors. He wrote about* Banks' Florilegium, *March 1983.*

The face and material could be pure Etruscan or out of some strange mythological past.

Garden is populated by inhabitants who might be characters in fairy tales—or inspirations for them.

They didn't take Nek Chand seriously. But I think that is the whole point about the garden—that it is outside the academic level. I found his work more interesting than all the education I had in college. For three long years I visited him as if I were going to a temple and each time I came away with a new idea."

The second six acres, just recently opened to the public, are off on a different tangent. Although just as inventive and peopled by imaginative creatures, there is more emphasis on the natural formation of the land here. This is landscape architecture of a very high international order.

A visitor travels in a system of canyons, ravines, perpendicular walls mounted by crenellated castle parapets, cupolas and little dollhouses. A canyon about 40 feet high leads to a classical Greek amphitheater used for shows of dance and music. In another dramatic little canyon, trees cling to the perpendicular walls and it is only when you are very near them that you realize they are made of clay. Their root systems, exposed below the curving, descending boles, have the sinuosity of a network of pretzels. Throughout this section there are streams and waterfalls, the waterfalls broad so that they form not torrents but rather thin curtainlike sheets of translucent water.

There is a one-and-a-half-acre terrace café decorated with potted flowers, cacti and flowering shrubs, for Nek Chand has become a notable horticulturist and he has created a botanical garden as well as a sculptural one. Many of the flowers and plants came from the refuse dumps of the rich, who had discarded living plants. Nurtured, propagated and cared for, thousands of them are now part of the area's most extensive and beautiful gardens. There are mulberry trees, chosen because of their suitability to the climate and the shade they give, and the pipal, a tree with religious meaning for the Indian people. There are silk-cotton, poplar, mango, mesquite, red gum, Indian jujube and the glorious flame tree. There are the physic nut, rose, oleander, bottlebrush, bougainvillea, China shoeflower, pagoda tree, lemon, guava, as well as herbs, hedge plants and climbers.

As a living backup for his extensive landscaping, Nek Chand maintains what amounts to a professional arboretum where he plants and cultivates the great variety of growing things—from grasses and mosses to shrubs, flowers and trees—which embellish his sculptural gardens.

The result of Nek Chand's professional competence, distinguished by a unique and creative imagination, is a kind of total landscape planning. An examiner's report at the University of Queensland, Australia—where Bhatti did his thesis on Nek Chand—pointed out, for example, that in environmental design, "no formal education can compensate for the lack of a sensitive understanding of a site obtained by actual observation and involvement"—the kind of understanding, that is, that Nek Chand possesses.

Overleaf: Villagers inhabit a terraced courtyard.

In time, years after Nek Chand had begun his work in secret, the government of Chandigarh recognized his accomplishment. It took him off road work, gave him the title of "Sub-Divisional Engineer, Rock Garden," a salary of about $150 a month and 100 unskilled laborers to assist him. With their help and his own inspiration and ingenuity, he intends to make the garden grow to 50 acres. He has no schedule, but he will do it.

Following a walk-through with Nek Chand which has left you stunned—not by the heat, not even by the humidity which wraps itself around you like a wet pack, but by what you have just seen—you are invited to his own domain for a cold drink. By now you have the feeling that you are in a Hans Christian Andersen tale, being guided by a benevolent wizard. The pebble-surfaced cottage within a walled courtyard is as good a sanctum for a visionary artist as you could imagine. You enter the studio and find yourself surrounded by life-size dolls of decided personality; they are more than dolls, they are inhabitants of the room. A cup of pencils sits on a table alongside a bowl of flower petals in water. Nek Chand is gray-haired, pleasant, personable and smiling. And he is remote.

He is pleased by his visitor's reaction but it is clear that it is not important to him, just as the mention of the huge names of Western contemporary art are not important to him. Picasso, Noguchi, Arp, Dubuffet, Klee, Miró are unknown to him. He has other inspirations, other directions.

What stops you time and time again, even days afterward, is the complexity and sophistication of the man's work. Here is a figure that might have been by Miró, here one that could have been invented by Max Ernst, another that might have sprung from Arp's imagination. The built-up rock formations or monoliths are pure Noguchi. These artists would have understood and applauded Nek Chand, who is entirely uninterested in what they have done in the 20th century, and you know that by now he is tired of hearing their names—they have nothing to do with him.

He will keep working, keep inventing. There is nothing quite like his garden anywhere else in the world, and it is in Chandigarh in the Punjab because that is where Nek Chand happened to be. It could have been anyplace—there are endless places—but there are very few creative wizards like this one.

Bhatti, an Indian, principal of a college of architecture, says: "His work is as significant as the Taj Mahal. There is nothing of importance in between." Who are you, Westerner, to argue?

Haunting figure in glowing beads—and with real human hair—stands guard as dusk comes to the garden.

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By Robert T. Cochran

Smedley Butler: a pint-size Marine for all seasons

He won two Medals of Honor overseas, but ended up dead set against foreign entanglements

He was small. He was round-shouldered. He weighed barely 140 pounds dripping wet, and even when he was dry his uniforms seemed to hang off him like oversize bathing suits. He never fought in one of his country's major wars. Yet this unlikely model for a recruiting poster was once described by no less a martial figure than General of the Army Douglas MacArthur as "one of the really great generals in American history."

The warrior was Smedley Butler. A legendary and almost archetypal Marine, he fought his country's battles from China to the Caribbean, winning two Medals of Honor. (He would have won a third, but regulations did not permit it at the time.) In an age when Americans regarded fighting with almost total approval, Butler was a reckless battler, charging forward like Shakespeare's Coriolanus, without ever looking to see if his men were following. In Butler's case they always were because they trusted and loved him. Higher-ups, by contrast, tended not to, for he was cantankerous and unorthodox, and he hated military punctilio and "prissy" civilian regulations.

Smedley Butler, in short, was the perfect real-life model of a fighting leatherneck, suitable for framing, say, in an early John Wayne movie about a time more innocent than today. He

Even as a brigadier general on maneuvers, Butler, at 41, still showed lack of spit and polish for which, along with bravery, he was noted.

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In bloodcurdling scene from the 1900 Boxer Rebellion, painted by a USMC artist, Marines, with Gatling gun, defend the U.S. legation in Peking.

began soldiering when Teddy Roosevelt and Manifest Destiny thrust American policy exuberantly outward, using ways and means that now would cause acute international embarrassment if not deep political crisis. Butler served in Nicaragua, Panama, Honduras and Haiti at a time when, if a small Latin nation reneged on its debts, the United States thought nothing of landing troops, taking over a country's customs services and seizing revenue to pay off the debt. (T.R. did exactly this in the Dominican Republic in 1904.)

Butler joined the Marines in 1898 when he was 16, marching off to the crash of John Philip Sousa's "The Stars and Stripes Forever." In 1898 open patriotism was still very much in fashion. In the popular mind the Spanish-American War, which inspired young Butler, was regarded as a "splendid little war." It was fought and handily won in a single summer.

In Butler's case, shouldering a rifle to "help free little Cuba" didn't come easily. The House Naval Affairs Committee had a powerful voice in Marine Corps matters and his father, Representative Thomas Butler, was a senior member. The Butlers were Quakers and the elder Butler insisted that his son stay in school. Smedley persuaded his mother to go with him from home in West Chester, Pennsylvania, to headquarters in Washington, where he lied about his age and was accepted. After he signed up his father confronted him. "How old did thee say thee was?" Smedley confessed he told Commandant Heywood he was 18, born on April 20, 1880.

"If thee is determined to go, thee shall go," Thomas Butler said, and then continued, with a twinkle in his eye, "but don't add another year to thy age, my son. Thy mother and I weren't married until 1879."

Training in those days was extremely basic. After six weeks devoted mainly to close-order drill and the use

The author wrote for SMITHSONIAN *about William Walker, who briefly controlled Nicaragua in the 1850s.*

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of the rifle, Butler was commissioned a second lieutenant, but by the time he got to Cuba the war was practically over. He saw no actual fighting. Once a stray Spanish bullet did whiz past his head at night. Terrified, he sprawled on the ground. His captain glanced down and snapped, "What the hell is the matter?" Butler's basic training was over. Thereafter he learned to soldier from the men he fought with. In later years he recalled as inspiration the sangfroid of a sergeant in China, which taught him an early lesson. After taking a glancing shot to the head during a march, the grizzled noncom just tugged his campaign hat down to stop the bleeding and kept on going.

In 1900 he volunteered to join a Marine force being sent to help rescue the U.S. legation in Peking. China was in the midst of the Boxer Rebellion. Masses of peasants called Boxers (a rough translation of the Mandarin for "righteous harmonious fists") were

Home from China as a hero at 19, Butler struck a full-dress pose.

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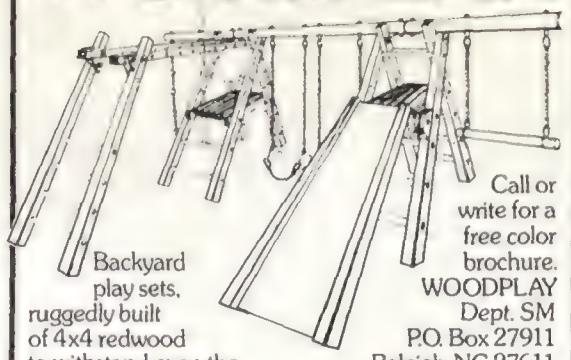

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attacking all foreigners whose governments and traders, after a series of deals with China's corrupt ruling dynasty, had gradually taken over much of the economy.

There was plenty of hard fighting as Butler led his platoon from Tangku across north China to reach the besieged legation. After one battle, Butler, another lieutenant and four enlisted men carried a wounded comrade back to their unit—17 miles, most of it through Chinese fire. The enlisted men won the Medal of Honor. Officers were not eligible for it then, so Butler and the other lieutenant were given battlefield promotions to captain, and subsequently the Marine Corps Brevet Medal. Butler had not yet turned 19.

Later he was wounded in a leg and in the chest. After Peking fell, he was also laid low by typhoid fever and his weight dropped to 90 pounds. West Chester gave him a hero's welcome and a sword of honor (presented to the Marine Corps museum by the family in 1953) when he was invalided back to the United States.

In China, an allied force of 19,000 that included only 600 Marines defeated 140,000 Boxers. Today that seems like very few Marines, but at the time, the number was about right. In 1900, U.S. Armed Forces were quite small—in all, 125,923 officers and men. The Marine Corps had 174 officers and 5,240 men, for instance, compared to 1,683 officers and 17,113 men for the Navy and an Army of fewer than 100,000.

This corporal's-guard military establishment was somewhat slender, however, for an aspiring world power. But in 1900, the Corps regarded itself (and still does) as the proud and the few. Marines were tough and often highly eccentric fighting men. In the field the only thing any soldier kept clean was his weapon. In those days the Corps lived and died by the Lee 6-millimeter straight-pull rifle, the Gatling gun and the Hotchkiss revolving cannon, a 37-millimeter weapon

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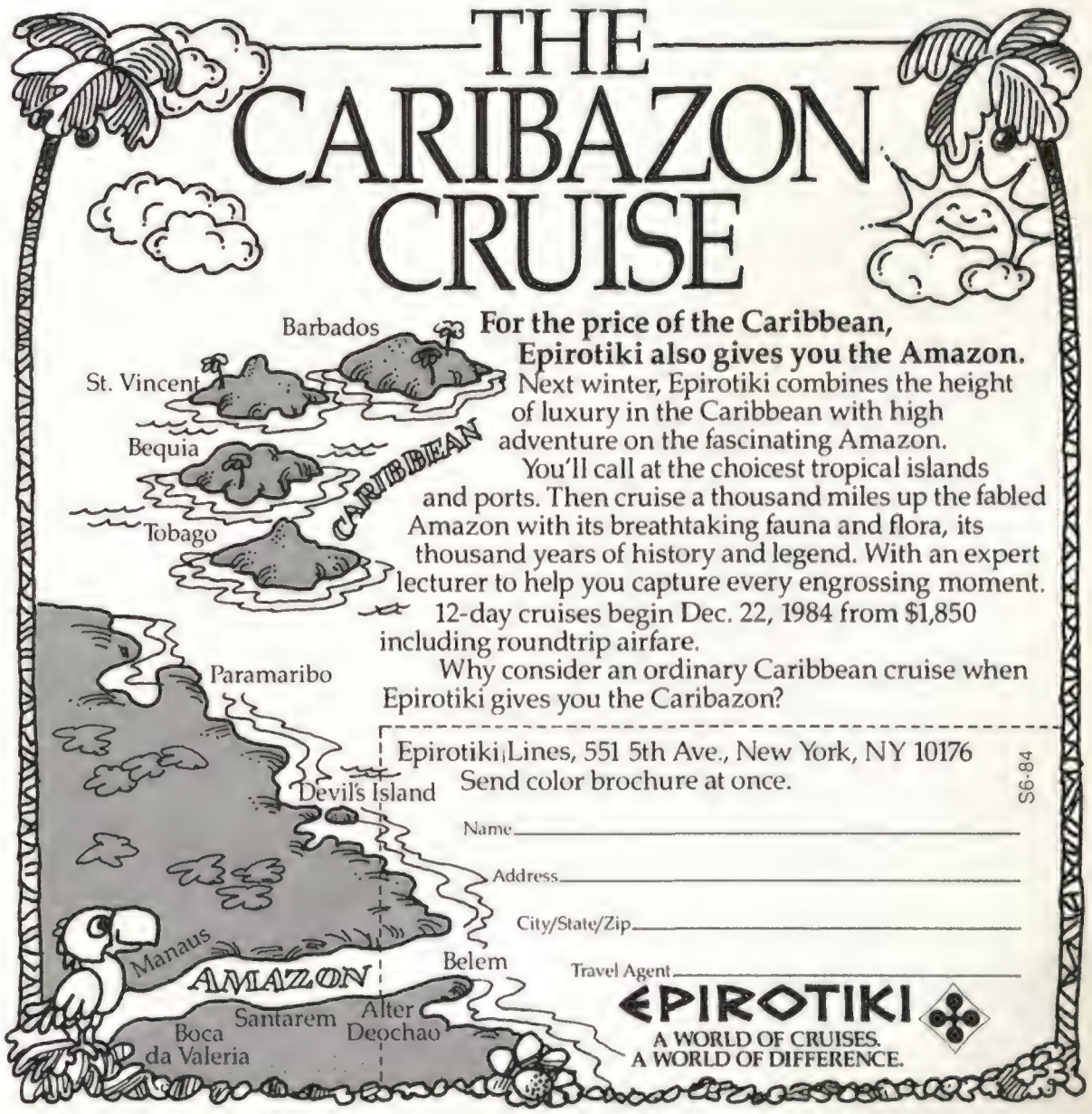

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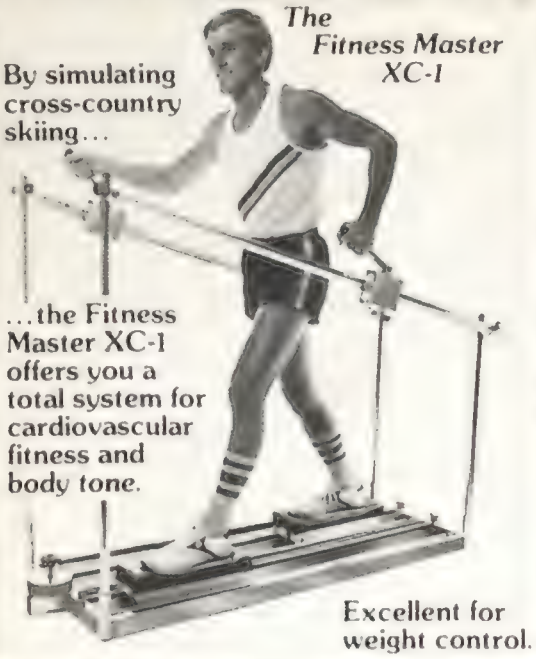
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Dusty squad of Marines, plus a primordial armored car, made up part of forces used by the United States in 1915 to try to bring order to Haiti.

that fired between 60 and 80 rounds a minute. A Hotchkiss was handy artillery. Small enough to mount in the prow of a landing boat, it could be shifted quickly to a wheeled carriage and wrestled ashore.

The United States had intervened for decades in Central American and Caribbean countries. Late in 1902, Butler was ordered south. President Roosevelt helped "liberate" the isthmus of Panama from Colombia the next year, creating a country in order to build a canal. Before going to Panama, however, Butler and his detachment were dispatched to nearby Honduras to protect American interests threatened by a revolution. As it happened, this tour of duty was to instill in Butler two attitudes that remained with him the rest of his career: dislike of the Navy, and a jovial contempt for the politics and revolutions of Central America.

The revolution in Honduras, at any rate, fully justified the attitude. "It wasn't exactly clear to me what all the fighting was about," Smedley later recalled. Ever after, he fought and generally dealt with the people there as unruly children—an attitude we would now regard as arrogant and condescending—and tended to think of the region's governments and revolutions as pure opéra bouffe.

Military engagements during this pre-World War I era mainly pitted soldier against soldier. The winner in such fluid skirmishes was the force that personally killed, wounded, captured or dispersed the most enemy soldiery. Butler had a genius for inspiring small Marine detachments to attack furiously. He himself was a ferocious fighter. He excelled at shooting, bayoneting and even, on occasion, attacking with his bare hands. Americans of the time reveled in such battlefield bravery, transferring to warfare the sort of "no hard feelings, may the best man win" attitude thought to exist in the boxing ring.

Between 1909 and 1914 Butler served three times in Nicaragua. The

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politics there being fairly Byzantine, Smedley sometimes found himself helping a government in power and sometimes siding with rebels trying to overthrow one. Battlefield confrontations frequently were ludicrous. Butler once told a pair of Nicaraguan-government generals besieging the town of Bluefields, where rebels were ensconced, that they could attack *only* if their army surrendered its guns first. The reason? He did not want American civilians to be harmed.

But, "How are we to take the town if we can't shoot?" the generals wondered. "And won't you also disarm the revolutionists defending the town?"

"There is no danger of the defenders killing American citizens because they will be shooting outwards," Butler replied, "but your soldiers would be firing toward us." Grumbling about the crazy Gringo, the generals marched their army away.

In 1910, during his last campaign in Nicaragua, Butler was ordered to reopen a key railroad line linking Managua and Granada, the country's major cities. He packed 400 Marines into boxcars and flatcars and mounted 16 machine guns on the roofs. One night as it inched along tracks that ran down the main street of Masaya, the train stopped in pitch darkness. Suddenly, gunfire erupted from buildings lining the street. He later described the ambush to journalist Lowell Thomas in an interview-biography of Butler entitled *Old Gimlet Eye*: "It was a gorgeous spectacle. A sheet of fire was spitting into the darkness on both sides of the road. Four hundred Marine rifles were popping with tongues of flame, the sixteen machine guns were rattling out a staccato beat, the engines were screaming and puffing—all in one narrow little street, while the natives shot back at us from both sides of the street."

Central Americans of that generation—or those in Masaya, anyway—apparently belonged to the Gang That Couldn't Shoot Straight. Marine losses in the town were five wounded and three missing, all of whom subsequently showed up. Nicaraguan losses are not recorded. The railroad line stayed open. Butler managed to

Duckboard walkways, enterprisingly scrounged by Butler to protect soldiers of World War I camp from mud, made him a different sort of hero.

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Back from France in 1919, Butler joyfully embraces an old service friend.

have the rebel leader, Luis Mena, shipped quietly off to Panama, and peace of sorts reigned in Nicaragua.

The year 1914 brought war to Europe in August. In April in this hemisphere, trouble flared between the United States and Mexico, where dictator Victoriano Huerta clung precariously to power. Mexican factions were busy fighting Huerta, and President Woodrow Wilson was offended by his repressive government and bloodthirsty ways. Beyond that, the United States had nearly $1 billion invested in Mexico at the time, and 40,000 U.S. citizens lived there to manage those holdings.

Wilson had sent a naval squadron to Mexico's Caribbean coast to help protect Americans in the cities of Veracruz and Tampico. Adm. Frank Fletcher, who commanded the fleet, soon was reinforced by 1,000 Marines —plus Butler, by now a major. The admiral dispatched Major Butler to Mexico City on a spying mission to discover the state of the city's defenses —critical information in case the United States should decide to invade the country, or find it necessary to evacuate U.S. citizens from the Mexican capital.

Wearing civilian clothes, Butler set off from Veracruz in a private railroad car posing as a public-utilities expert, which gave him a good excuse to visit strategic installations in towns along the way. Once in Mexico City, he became a U.S. Secret Service agent looking for a fugitive who might have enlisted in the Mexican Army. Huerta gave him a pass to visit army barracks, and Butler accumulated maps and information about troop dispositions.

Posing as a guidebook author, he interviewed U.S. citizens living in the city, noting their addresses and emergency food supplies. He was not fluent in Spanish, but with the help of U.S. Chargé Nelson O'Shaughnessy and an ingratiating manner, he persuaded Huerta to let him tour Chapultepec, the fortress-hill commanding the city.

Heading back to Veracruz, with his findings stuffed into a false bottom in his valise, Butler realized that two Mexican secret-service men were tailing him. When the train stopped in the yards outside Veracruz, he slipped into a washroom in his pajamas, jumped out the window, dressed between two freight cars and made his way back to Admiral Fletcher—with Mexicans in hot pursuit.

Relations between the two countries broke down entirely when Wilson learned that a large shipment of arms was on its way to Huerta in a German ship. To keep the arms from landing, Admiral Fletcher occupied Veracruz and its customhouse. In mid-April 1914, seamen and Marines were landed, with Butler in command of a battalion. The Mexican army prudently retired, leaving armed civilians and naval-academy cadets to oppose the invaders. Nevertheless, fighting was fierce, though it was mainly house-to-house mopping-up to dislodge snipers.

Butler would put a machine gun at an intersection to pin down defenders and advance calmly, pointing with a walking stick to direct Marine fire at snipers as the leathernecks smashed into and searched houses on both sides of the street. By then, officers were eligible for the Medal of Honor and Butler's bravery earned him one. At first he refused it, saying he had done nothing heroic, but the Navy Department testily ordered him to wear it anyhow and eventually he did.

Butler's most bizarre exploits in that part of the world began in 1915, when U.S. forces occupied Haiti. The second-oldest (after the United States) independent nation in the hemisphere, impoverished Haiti had had a bloody, tumultuous history since winning freedom from France in 1804. By 1915 it was a nation in name only. One revolution followed another and public order became almost nonexistent. There were seven presidents between 1908 and 1915, and the U.S. Navy "visited" the country 19 times before World War I.

With political anarchy showing no sign of decline, Washington began to worry lest Germany, already engaged in a U-boat war to cut off supplies to the British and French, take advantage of the chaos to build a submarine base at Môle—an immense natural harbor on the northwest coast—thus menacing the Panama Canal. There were also U.S. investments, in Haiti's

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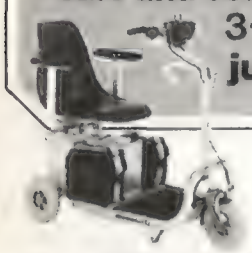

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Smedley did not find Philadelphia politics entirely uncongenial. He played marbles with Mayor Kendrick (right) for good publicity.

case mainly a national bank and the country's only railroad.

Once ashore, the Navy realized that a sub base was a far-fetched possibility, but noted that the country was in such a mess that all semblance of government seemed about to disappear. One immediate remedy was to set up a native constabulary. No Haitians seemed competent to do the job, so the Marine Corps did it. Butler, by then a Marine lieutenant colonel, was also hastily commissioned a Haitian major general, as the constabulary's organizer and commander.

The ranking officer in Haiti, Major General Butler got powers equivalent to Minister of the Interior. He was also the man mainly responsible for imposing U.S. policy. He was a genial —if by now a bit cynical—taskmaster. He manipulated inefficient Haitian officials flagrantly and successfully, and once in a while was manipulated himself. During a crisis the government seemed about to go out of business, at least officially, because it did not have the number of cabinet officers required under Haitian law. Butler's Haitian aide obligingly supplied one, rounding up his barber for the job, a man who could neither read nor write. The barber was duly sworn in. His first official act was to collect a paycheck. The aide took $50 of it, which the barber had owed him for years—and Butler realized why the new minister had been appointed in the first place.

Bands of guerrillas, little more than pillaging bandits, still roamed Haitian mountains and jungles, sniping at Marines and keeping the countryside in turmoil. Butler's men chased them until a large band of diehards gathered for a last stand in a mountaintop redoubt called Fort Rivière. By-the-book American officers said it would take at least a regiment of infantry plus artillery support to dislodge them. Butler said pshaw, averring that given a hundred Marines he could do it easily.

Leaving most of his force in the woods below the fort, Butler inched up to its walls with a 24-man storming party. The guerrillas had blocked the fort's regular entrance, but he discov-

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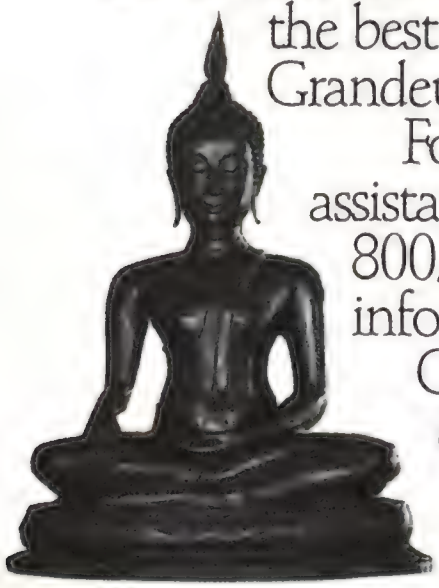

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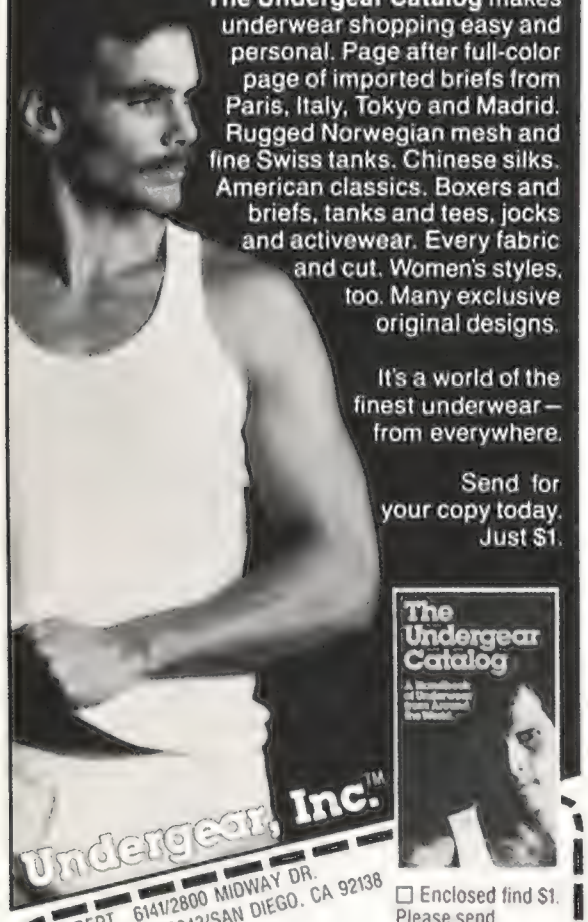

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ered a pitch-dark drainage tunnel, about three feet wide, that led to the fort's main courtyard. Flattened against the wall next to the opening, he realized it was the only way in. "I had never experienced a keener desire to be some place else," Butler would later recall.

With Marine Sgt. Ross Iams and Pvt. Samuel Gross, Butler jumped into the tunnel only to be shot at from point-blank range. The guerrilla guard who fired at them retreated, but kept shooting from the other end of the drain. "We were almost completely blocking the hole," Butler said. "It seemed incredible that the bullets should have gone wild." With Iams leading the way, the three Marines now advanced to what looked like certain death. Miraculously, while the guard was reloading his rifle, Iams pushed forward, shot him and leaped into the courtyard, Gross and Butler close at his heels. Sixty or 70 "half-naked" men pounced on them. But the three managed to kill the leaders. Seconds later the rest of Butler's company popped up into the courtyard. The defenders seemed completely unstrung by this event.

The amazed Butler described what happened next: "They threw away their loaded guns and grabbed swords and clubs, rocks and bricks, which were no match for bullets and bayonets." The fort was taken. Iams, Butler and Gross were awarded the Medal of Honor. It was Butler's second.

Only two Marines have won two Medals of Honor for separate acts of heroism: Sgt. Dan Daley and Butler. Daley won his first medal in China and his second in Haiti after pulling a machine gun out of a river during a fierce nighttime battle. Had it not been for his earthy language, he might have won a third during World War I, when he achieved Marine Corps immortality. For Daley is the man who, urging his platoon forward at Belleau Wood, coined a classic Marine battle cry: "Come on, you sons of bitches! Do you want to live forever?"

When the United States entered World War I, Butler was 35. By then his crusty temperament had made him plenty of enemies among the higher brass who saw him as a brilliant fighter but not "reliable." He pulled every string he could think of to be sent to France. Finally he got there, in September 1918, but not to the front. Instead he wound up in command of Camp Pontanezen, a vast debarkation depot near Brest that funneled the American Expeditionary Force to the battlefields. He operated the camp efficiently, while paying little attention to regulations, but he was disconsolate. Recalling the situation later, he said, "To sit in the rear and run this mud-hole was the first in a series of jolts that finally destroyed my enthusiasm for soldiering."

Conditions were appalling. The fall rains came and the camp floated on a sea of mud. It was much plagued by shortages of food and blankets, plus an extra helping of disease and official indifference. Butler concentrated on the mud. In nearby Brest, he found an immense cache of surplus duckboards used as trench floors during the fighting. Secretary of War Newton Baker had sent novelist Mary Roberts Rinehart to report on conditions at the camp. It was she who later told the story of Butler and the duckboards: ". . . as the ground under the tents was nothing but mud, he had raided the wharf at Brest of the duckboards no longer needed for the trenches, carried the first one himself up that four-mile hill to the camp, and thus provided something in the way of protection for the men to sleep on."

Word of the exploit spread. General Pershing authorized a duckboard shoulder patch for units staffing the camp. Butler acquired a new sort of public reputation, though his role in the only consequential war of his active Marine career was anything but the kind of heroism that earns Medals of Honor. And once more he had earned the gratitude of his men, in

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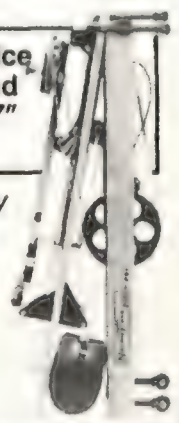

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this case the thousands who passed through Camp Pontanezen. "I'd cross hell on a slat if Butler gave the word," one was quoted as saying. The gratitude of enlisted men would eventually plunge him into veterans' affairs.

Promotion was slow in the postwar Marines. But in 1923, W. Freeland Kendrick, the newly elected mayor of Philadelphia, asked Butler to take leave from his command to become the city's Director of Public Safety. Philadelphia's municipal government was notoriously corrupt, the new prohibition law had brought even greater corruption, and Butler would be responsible for the police and fire departments.

He refused at first. Then President Calvin Coolidge was persuaded to grant him leave and Butler took the job to encourage good government.

He ran the police force like a Marine regiment. Though he failed to rid Philadelphia of vice, he failed spectacularly. During the first week on the job, he raided 480 speakeasies. The city's ward bosses tried to persuade him to go easy, but thousands of local church members passed resolutions supporting him.

Even so, Butler wound up by antagonizing everyone. Wets inevitably disliked him because he closed down saloons and arrested bootleggers. He outraged the drys as well, by saying that he was a drinking man himself and that the only serious issue in Philadelphia was not drink but obedience to the law. And when he threatened to padlock a major hotel in the city on New Year's Eve because it had broken the law by serving liquor, both political parties turned on him. After two years, Butler found himself back in the Corps. As he was leaving town he told reporters, "Cleaning up Philadelphia vice is worse than any battle I was ever in."

In 1927 he was returned to China again, this time as a brigadier general commanding a force of 5,000 Marines dispatched to Shanghai. The country was torn by bitter civil war. Chiang Kai-shek led a nationalist government that was strongest in the south. It fought with savage warlords for control of the north, and foreigners every-

In 1927, on second tour of China, Butler (left) directs Marines in fire fight with skills learned, he said, helping Philadelphia fire chiefs.

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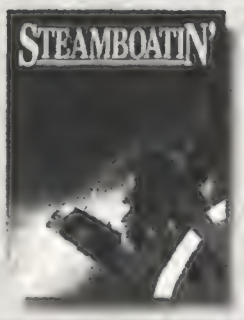

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A 1931 cartoon notes fuss after Butler talked of Mussolini's ruthlessness.

where fled to the ports and the protection of foreign expeditionary forces. Ordinary Chinese starved by the millions. Butler's mission—and he stuck to it—was not to defend foreign extraterritorial rights but rather to protect American lives.

When sharp fighting broke out in the north, Butler took 4,000 men to Tientsin. Perplexed about U.S. policy in China, he wrote to his father in Washington for advice. The reply: "I do not think that anyone knows our State policies, concerning the situation in China. I do not believe there are any." Whether the United States had a policy or not, Chiang Kai-shek gradually subdued the warlords, and by January 1929, Marines began pulling out of China. Back home, Butler was promoted to major general—at 48 the youngest Marine yet to hold that rank. But once more he was faced with commanding the Marine base at Quantico—or resigning.

Blocked from higher command and (temporarily) with no more wars to go to, he now began to exploit his national reputation by appearing on the lecture circuit. Generally he spoke out for the Corps and for veterans be-

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cause he felt that an ungrateful country was treating them badly. Just as he was going to retire, he made a speech that he thought was off the record at a club in Philadelphia. To illustrate the barbarity of dictators, he told a story about Mussolini's limousine running over a child while tearing through a village. He had heard the story from Cornelius Vanderbilt, also on the lecture circuit, who had been riding with Mussolini. According to Butler's version, the Italian dictator did not stop but sped on, saying "It was only one life and the affairs of state could not be stopped by one life."

The story was essentially true, but Butler didn't have the words quite right. What actually happened, Vanderbilt said later, was that when he looked back in horror after the child was hit, Mussolini patted his knee and said, "Never look back, Mr. Vanderbilt, always look ahead in life."

The speech provoked an international uproar. Many Americans had no use for the Italian dictator, but the U.S. government, hoping for international arms agreements, was reluctant to antagonize him. Secretary of State Henry Stimson apologized to Italy. Butler's enemies in Washington decided that this time he had indeed gone too far and persuaded President Herbert Hoover to order his court-martial. But public outcry on Butler's

Shortly after retirement, Butler had a 1935 *nez à nez* with look-alike Durante.

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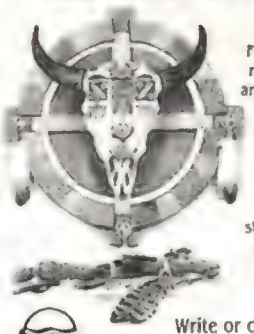

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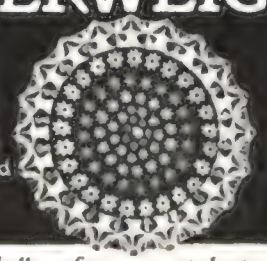

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behalf was so great that the government dropped the charges. Humorist Will Rogers spoke for many Americans in his nationally syndicated newspaper column: "I was glad to see Smedley Butler get out of his case as he did. You know that fellow just belongs in a war all the time. He don't belong in Peace time. He is what I would call a natural born warrior. He will fight anybody, any time. But he just can't distinguish Peace from war. . . . I do admire him."

Smedley Butler left the Marine Corps for the last time on October 1, 1931. He did not just fade away, however. To everyone's surprise he became an active isolationist, but an isolationist with a difference. Years as a Marine convinced him that we fought overseas to protect U.S. business interests, rather than U.S. interests generally. He was all for strong armed forces, but for defense, not foreign entanglements.

Veterans organizations—the American Legion and the Veterans of Foreign Wars—sought out Butler, and more sinister groups attempted to. In 1933 he became involved in one of the period's most mysterious, bizarre, forgotten—but authenticated—incidents. Men claiming to represent the Legion visited him. Obliquely, they made a strange proposition. They would back him to organize American Legionnaires and other veterans into an army to overthrow President Franklin Roosevelt. Supposedly there was ample money—up to $300,000,000—to finance the revolution. Butler played along to learn more. When he was sure he was dealing with an American fascist movement he went public with the story, testifying before the House Special Committee on Un-American Activities in November 1934.

The committee found that Butler was telling the truth. Nothing much happened because few people really *wanted* to believe him, and because some prominent people were implicated; the story was hushed up. Butler, meanwhile, kept on making anti-war speeches. As Italy attacked Abyssinia, Spanish loyalists joined in bloody struggle with Francisco Franco's forces, and Europe began its last slide toward World War II, Butler kept urging strict U.S. neutrality. As usual, he annoyed both his enemies and his natural allies.

Of course interventionists disliked him, but fellow isolationists, many of whom were pacifists opposed to all armaments, were dismayed by Butler's fierce conviction that America should arm itself to the teeth—precisely to keep any enemy from daring to attack us. His son remembers a day in 1939 when a cousin, just back from Germany, praised Adolf Hitler to the skies for his efficiency and national spirit—as a number of people in America did at the time. Butler listened quietly. But as he escorted her to the door, he said evenly, "If Hitler ever tries to come over here, I personally will be on the beach to see that he doesn't land."

Nobody can say what he would have made of World War II. In the spring of 1940 Butler's health suddenly failed. He died in June, probably of cancer, just as the cousin's hero, Adolf Hitler, was overrunning hapless France. It would be three months until Congress, after bitter debate in which Butler would surely have found a way to make himself heard, finally extended the Selective Service Act—by just one vote.

In the late 1930s, not long before his death, Butler often spoke out for rearmament, but opposed getting involved with looming war in Europe.

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Book reviews

The Middlewest
Vol. 3 of *American Jewish Landmarks: A Travel Guide and History*
Bernard Postal and Lionel Koppman
Fleet Press, $20.95/$10.95, paper

The romance of the westward expansion acquires a Jewish cast when one pages through the third volume of *American Jewish Landmarks*. In a plain, let's-stick-to-the-facts style, this encyclopedic guidebook peoples the history and the geography of the ten states of the Midwest with Jewish pioneers: humble peddlers originally from England and Central Europe; soldiers who distinguished themselves on one or the other side of the Civil War; philanthropists who left behind public parks, fountains and, eventually, art museums; watch repairmen who earned civic prestige by working hard; fur traders who befriended the Indians; financiers who took great risks in ventures set in the wilderness; clothing-store owners and crusading newspaper editors; mayors and manufacturers.

Jews traditionally read history for signs and portents. Here, the facts are surprising, curious and provocative.

What is one to make of Jews settling and prospering in Minnesota before the Swedes? Or of the fact that one of Wisconsin's original settlers (at age 16) and the owner of its first sawmill was John Lawe, a Jew? He married the daughter of an Englishman and a Chippewa woman, became an Episcopalian and a key figure in the fur trade and in the territorial legislature, and earned fame as the benefactor of the first Episcopal mission in Green Bay in 1825.

Is there an explanation as to why, in 1773, nearly one-third of today's state of Illinois was owned and explored by a syndicate which had eight Jews among its 22 members? Why did Jews throw themselves so passionately into investing in the unpredictable, dangerous and lawless frontier? (Eventually the syndicate lost its claim to the land, but not before the Jewish entrepreneurs outfitted and partially financed the expedition that drove the British out of the region.)

One wonders how Hollywood could have missed memorializing the colorful character of Adolph Gluck, a Hungarian Jew who settled in Dodge City in 1878 and was instrumental in hiring marshals Bat Masterson and Wyatt Earp for the purpose of bringing law and order into that raw frontier town.

Or take the case of Abraham Jonas, the Jewish lawyer and Masonic Grand Master whom Abraham Lincoln called one of his best friends. The two began a lifelong friendship during Jonas' days in the Kentucky legislature. When Jonas was dying in 1864, his family asked President Lincoln to permit Charles, one of Jonas' four Confederate sons, to visit his father. Lincoln promptly gave prisoner of war Charles Jonas a three-week furlough.

In surveying the Jewish dimension of the westward expansion, it is hard to separate specific Jewish motivation from that of the general Americans'. In establishing the first synagogue in Chicago in 1847, Jews called their congregation "Anshe Mayriv"—which translates as the

English-born Abraham Jonas settled in Kentucky, was close friend of Lincoln.

Men of the West. In this instance, lapidary Hebrew, high and holy, coincides with the laconic American vernacular.

The authors, Bernard Postal (who died in 1981) and Lionel Koppman, refrained from interpretation or exegesis. Painstakingly, they collected not just historical facts but a town-by-town list of Jewish institutions and places of interest. They set up 36 categories: from works of art illustrating Jewish themes to kosher eating facilities, from housing complexes established for elderly Jews to historic sites or buildings erected by, dedicated to or named for Jews.

Postal and Koppman produced a unique document, as basic as a map and just as important. Once the fourth and final volume—on the West—is added to this neo-Victorian compendium, *American Jewish Landmarks* will be a standard reference work for scholars and a sought-after guidebook for the thoughtful traveler, as well as a source of inspiration for writers in search of promising raw material in locale, characters and romance.

Charles Fenyvesi
Editor of the *Washington Jewish Week*

London Labour and the London Poor
Henry Mayhew
Dover (4 vols.), $38.50

This is Dover's second reissue (following its 1968 edition) of a classic sociological study that remains a work of high human interest and permanent literary value. Few books, in fact, are more worthy of being kept in print.

Henry Mayhew's exhaustive analysis of the subculture of poverty and crime that inhabited, and afflicted, midcentury London originally appeared serially, beginning in 1849 as a series of investigative articles in the *Morning Chronicle*. The entire work—all of it that was completed, at any rate—was published in full in 1861-62. It comprises, as its author proudly claimed, the first attempt "to publish the history of a people, from the lips of the people themselves." It is a vast and terrible picture of life, and, as Mayhew had intended, a powerful rebuke to a settled, comfortable society that denied the existence of its dark, starved underside.

Mayhew (1812-87) was a maverick writer in several genres whose insistent social conscience and uncompromising directness found their perfect subjects in the torn and tattered underworld peopled by street sellers and exhibitors, pauper laborers, prostitutes, thieves, swindlers and beggars. His approach was to classify the thousands of people he interviewed into various occupational (and, I suppose, anti-occupational) categories, and report in enormous detail on their work practices, homelife and personal histories.

The result was a coolly impassioned broadside on behalf of "those that *will* work, those that *cannot* work, and those that *will not* work." Mayhew criticizes the official London census for underestimating the numbers of such people, deplores "the defective state of our educational institutions"; he importunes against a law that presumes to identify some street people, in Mayhew's words, as "rogues and vagabonds," and urges compassion for those sunk in apathy and despair, arguing that the "effects of uncertain labour . . . are to drive the labourers to improvidence, recklessness, and pauperism."

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The work can be faulted, really, for both disorganization and overorganization. It contains many, many pages that even attentive readers will want to skim.

None of this matters. Besides its obvious historical and sociological value, *London Labour* is, in its best pages (of which there are hundreds), as engrossing as a prime Victorian novel. Students of Dickens, in fact, will find here the factual counterparts of such unforgettable fictional creations as the workhouse and thieves' gangs in *Oliver Twist* and the varied evidences of urban poverty in *Bleak House*. And admirers of George Orwell may sense that many of his reportorial tactics and political stances may have profited from Mayhew's example.

This is the sort of browser's book that no browser can put down before spending an hour or two absorbed in its incomparable display of life. I expect to be rereading it for the rest of my life, and I cannot recommend it too highly.

Bruce Allen
Literary critic

The Selected Papers of Charles Willson Peale and his Family
Edited by Lillian B. Miller
Yale University Press, $50

Sometime during the past 20 years I picked up the notion that Charles Willson Peale was not a very nice man—not quite the right image for one of the most illustrious figures of the early years of the nation. So the image on the jacket of the book aroused my suspicions. A self-portrait, it reveals a fresh young face, engaging, ingenuous, perhaps even innocent.

I'm happy to report that the young Peale emerges exactly as he appears on the jacket. I was wrong; he *was* ingenuous and he does appear to be engaging, even if a little desperate from time to time as he tries to come to terms with a false patrimony, to cope with debt unwittingly assumed and to eke out a living to support his family (including at times brothers, sisters and so on whom he tried to coerce into the painting profession).

The book is a model of scholarly impartiality, footnoted to the hilt and completely admirable—another triumph for one of the heroes of American studies, the editor of the Peale Papers and historian of American culture at the National Portrait Gallery, Lillian B. Miller.

This may not be a book for the average reader unless he or she is an enthusiast or a social historian deeply interested in the minutiae of a painter's existence at the time of the American Revolution. It is very detailed, indeed. It bulges with all kinds of wonderful trivia such as the price of turnips and when he paid the milkwoman—the very fiber of the new quantitative social history.

It also contains important information on the business of being a painter and,

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in my opinion, it is an enlightened as well as a fascinating story—how a group of high-minded men put up funds to send a local lad with talent to London to study with the prominent fellow American Benjamin West in order to bring fame and honor to his native land. (Peale didn't get quite as much out of it as he should have; he missed his young wife too much and came back too soon.)

He painted some marvelous pictures in the next few years. The late-Colonial gentry of Maryland, Virginia and Pennsylvania stand revealed by Peale in the pride of their station and accomplishments. "My studies and labours for several years past has been insessant, but not always to much profit," Peale wrote West in 1788. He hoped that an "Exhibition of mooving pictures" (a somewhat amateurish-sounding novelty) would help his fortune, which it didn't, and then turned to "a no less ardious undertaking that is the preserving Birds Beasts etc. to form a Museum." That wasn't much better, though it gained him some fame and a certain immortality. He continued to struggle to provide heat, food and clothes for his burgeoning family, named after such painters as Raphael, Titian and Rembrandt. He continued to paint portraits and miniatures (while his eyes lasted) in order to pay the bills.

His interests widened as this marvelous book reveals. His first wife died, and this volume ends in 1791 with the 50-year-old painter, printmaker, inventor and museum owner marrying a 26-year-old New York woman and carrying resolutely, curiously and fascinatingly on.

Graham Hood
Chief Curator, Colonial Williamsburg Foundation

A Writer's Ireland: Landscape in Literature
William Trevor
Viking, $25

To those unfamiliar with the books of William Trevor, the Irish-born author of many fine short stories and novels, his latest work, *A Writer's Ireland*, will prove a memorable introduction to a storyteller of extraordinary wisdom, wit and style. "The map of Ireland," Trevor, who lives in England, writes, "is not unlike a sleeping infant: the rounded head of Ulster, fingers scattered to make the islands and inlets of the West, toes spread out in Dingle and the O'Sullivan country, Carnsore Point the tip of the spine."

Interweaving history and legend with fragments of poems, stories, novels and reminiscences, Trevor takes the reader along on a chronological journey through this island, from its ancient past to its present. Drawn under the author's spell, the reader discovers an Ireland of eerie contrasts—haunting and enchanted, beautiful and dreary, tranquil and violent.

It is a magical sort of journey: odd, shadowy, mystical characters keep crossing our path, holding us spellbound with their lyrical tales and songs. "It is a writer's journey," Trevor explains to us, "a tour of places which other writers have felt affection for also, or have known excitement or alarm in."

Deftly, and with an eloquence that is often moving, Trevor evokes an Ireland that seems a very lonely place in which to live. Everywhere lie monuments to a harsh, despair-filled past: ruined abbeys

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and crumbling towers, fields and pastures covered with jagged stones, shells of great country houses that were burned during the Troubles, bombed-out sections of Derry and Belfast. It is not surprising that the land and its turbulent history have provided so much inspiration to Ireland's writers. It is also not surprising that so many of those writers have preferred to live elsewhere.

While Trevor quotes from the work of many famous authors such as Edmund Spenser, Oliver Goldsmith, James Joyce, Jonathan Swift, Frank O'Connor, Mary Lavin and Seamus Heaney, he also acknowledges the importance to Irish literature of many obscure ones. For example, Anthony Raftery (1784-1835), "the blind beggar-poet of the roads and the wilds," is quoted because he seems to epitomize the savage, exotic, half-lost Ireland of his day. Trevor suggests that whole periods of Irish literature have become lost because of the invasions, famines, colonializations and other cruelties that have been visited upon the land over many centuries.

In one of the more impassioned sections of the book, Trevor examines the long, troubled history between Ireland and England. With a certain bluntness of feeling, he describes how, during the 19th century, English writers such as Dickens, Thackeray and Eliot were creating great expansive novels about their society, while Irish writers were creating none. "Victorian England was like a great mahogany edifice, enriched with curlicues and secret places, with frills and antimacassars to hide what was best not seen. All the time in the world was at the disposal of the people at the hub of Victoria's empire, bolstered by as much confidence as the ruling classes could comfortably sustain. . . . Ireland, compared, lay in fragments, a battleground for seven centuries, a provincial wilderness beyond the pale of Dublin and the life of the big country houses, sick at heart and with half of its population starving."

A Writer's Ireland achieves vividly what few books are able to achieve at all: a sense of a particular place in all its power and mystery, and the mood of its people. Perhaps it is not a bad comparison to say that the book conveys the same qualities of the modern short story that Trevor describes: "moments and subtleties and shadows of grey."

Ronald Varney
New York writer and critic

Additional reading

Origins of life (p. 42)

Genesis on Planet Earth by William Day, Yale University Press, May 1984

Autopoiesis and Cognition by Humberto R. Maturana and Francisco J. Varela, D. Reidel Publishing Company (Dordrecht, Holland), 1980

Early Life by Lynn Margulis, Science Books International (Boston), 1982

Earth's Earliest Biosphere, edited by J. William Schopf, Princeton University Press, 1983

Charles Moore (p. 54)

Charles Moore by Gerald Allen, *Monographs on Contemporary Architecture* series, Whitney Library of Design (New York), 1980

Charles Moore and Company, special issue No. 7, *GA Houses*, edited and photographed by Yukio Futagawa, A.D.A. EDITA (Tokyo), 1980

The place of houses by Charles Moore, Gerald Allen and Donlyn Lyndon, Holt, Rinehart and Winston, 1974

Dimensions: Space, Shape & Scale in Architecture by Charles Moore and Gerald Allen, Architectural Record Books (New York), 1976

Ancient Olympics (p. 64)

The Eternal Olympics: The Art and History of Sport, edited by Nicolaos Yalouris, Caratzas Brothers (New Rochelle, New York), 1979

Olympia: Gods, Artists, and Athletes by Ludwig Drees, Praeger, 1968

The Olympic Games: The First Thousand Years by M. I. Finley and H. W. Pleket, Viking, 1976

The Myth of Greek Amateur Athletics by David C. Young, Ares (Chicago), 1984

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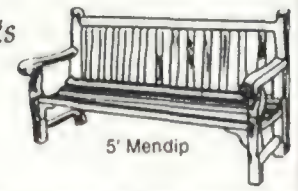
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Veterinary hospital (p. 76)

A Legacy and A Promise by John Martin, VMD (Centennial Office, School of Veterinary Medicine, 3800 Spruce Street, Philadelphia, Pennsylvania 19104), 1984

Bellwether (quarterly news magazine of the School of Veterinary Medicine), University of Pennsylvania (Philadelphia)

Toe shoes (p. 88)

Portrait of Mr. B: Photographs of George Balanchine, With an Essay by Lincoln Kirstein, Viking, 1984

Dancershoes by Daniel S. Sorine & Stephanie Riva Sorine, Knopf, 1979

Balanchine's Complete Stories of the Great Ballets by George Balanchine and Francis Mason, Doubleday, 1977

Tears (p. 102)

"Crying Behavior in the Human Adult" by William H. Frey II et al., *Integrative Psychiatry*, September-October 1983

"Not-So-Idle Tears" by William H. Frey II, *Psychology Today*, January 1980

The Hour of Our Death by Philippe Ariès, Knopf, 1981

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Boomerangs (p. 118)

Boomerang by Benjamin Ruhe, Minner Press (Washington, D.C.), 1982

All About Boomerangs by Lorin L. and Mary Ellen Hawes, Hamlyn Group (Sydney), 1975

"The Aerodynamics of Boomerangs" by Felix Hess, *Scientific American*, November 1978

"Why boomerangs boomerang (and killing-sticks don't)" by Jacques Thomas, *New Scientist*, September 22, 1983

Nek Chand (p. 126)

"Nek Chand's Garden Fantasy" by Michael T. Kaufman, *New York Times*, April 3, 1983

"A Secret Kingdom in Chandigarh" by Cleve Gray, *Art News*, September 1983

Smedley Butler (p. 137)

Old Gimlet Eye: The Adventures of Smedley D. Butler, as told to Lowell Thomas, Farrar & Rinehart, 1933

The Plot to Seize the White House by Jules Archer, Hawthorn Books, 1973

The Landing at Veracruz: 1914 by Jack Sweetman, United States Naval Institute, 1968

Smithsonian highlights

The Smithsonian's annual Festival of American Folklife is once again setting up its tents, stages and demonstration workshops, focusing this year on Alaska, the black expressive culture of Philadelphia and the folklore of the aging. From June 27 to July 1 and July 4 through 8, the Mall will offer something for every visitor: Aleut craftsmen, senior-citizen thespians, the riches of Philadelphia's black culture (including tap dancing and break dancing, and music from blues to "doowop"). Gastronomes can choose between Philadelphia-style soul food and Alaskan seafood. Hours will be 11 A.M. to 5:30 P.M. daily, with special evening dance parties and concerts.

Special June exhibits and events

Hirshhorn Museum & Sculpture Garden
Artistic Collaboration in the 20th Century (June 9-August 19) More than 100 works by 70 sets of collaborators, ranging from Surrealists' "exquisite corpse" drawings to video piece by Douglas Davis, Joseph Beuys and Nam June Paik.

Cooper-Hewitt Museum (New York)
Manhattan Skyline: New York Skyscrapers Between the Wars (June 12-September 23).

National Museum of African Art
African Mankala (June 20-October 7) Exhibit of 27 sculptured game boards.

National Museum of American Art
Advancing American Art: Politics and Aesthetics in the U.S. State Department Exhibition, 1946-48 (June 1-October 8).
Erastus Salisbury Field: 1805-1900 (June 8-September 4) Twenty-nine paintings.

National Portrait Gallery
Erastus Salisbury Field: 1805-1900 (June 8-September 4) Exhibit of 73 portraits complements Field's historical and visionary view at NMAA.

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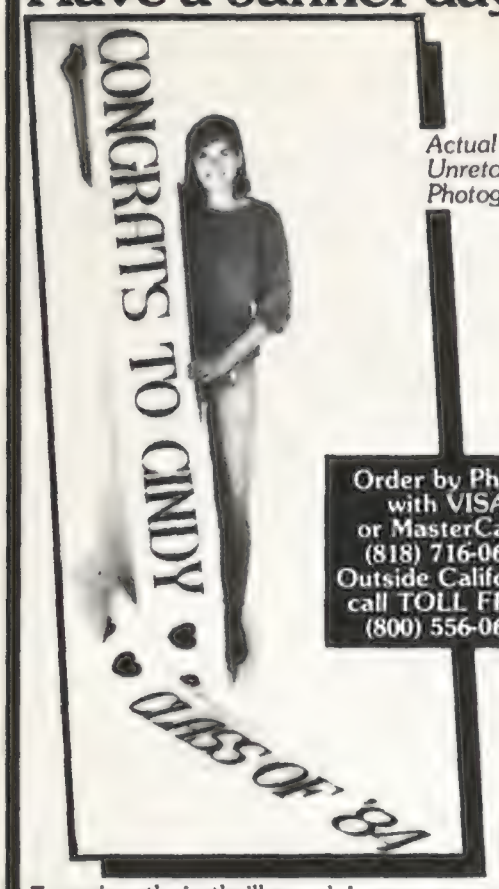
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National Museum of American History
Southeastern Potteries (June 8-August 15) Two centuries of a still-strong American pottery tradition are documented with 110 objects and photographs.

Anacostia Neighborhood Museum
Black Wings (through August 5) Exhibit tells story of black American aviators.

National Museum of Natural History
Exploring Microspace (through July 15) See *Highlights Continued.*

National Air and Space Museum
Spinning through Space (June 2; 9 A.M.) Monthly sky lecture.
Golden Age of Flight (runs indefinitely).

Smithsonian in Edinburgh

Smithsonian Associates lucky enough to be planning their summer vacations in Europe might want to include a trip to Edinburgh. A special exhibition called "Treasures from the Smithsonian" will be sent to the Royal Scottish Museum in time for the 38th annual Edinburgh International Festival (August 12 to September 1). There will also be seven musical groups including a jazz quartet, a Cajun band and a traditional black female vocalist group. For a schedule of performances, call Smithsonian Visitor Information at (202) 357-2700.

Resident Associate Events

To become a Resident Associate, or to find out about the many other activities presented monthly, or for fee and ticket information, call 357-3030. Here are some June events:
Hello, Harry! A Musical Revue of the Broadway Shows of the Truman Years (June 1, 8 P.M.; June 2, 3 P.M. or 8 P.M.).
A John McCormack Evening (June 3; 7:30 P.M.) Ireland's greatest tenor, Frank Patterson, sings immortal favorites.
Remembering William Powell: A Film Series (June 10, 17 and 24; 7 P.M.) Includes *The Thin Man* and *Life With Father.*
Memories of the Surrealists ((June 14; 8 P.M.) Slide-illustrated lecture by poet, critic and publisher Edouard Roditi.
A Cabaret-Concert with Martha Schlamme (June 17; 7:30 P.M.) The music of Kurt Weill and other composers.
The Solar Max Mission: Space Shuttle Update (June 20; 8 P.M.) Lecture by Gregory P. Kennedy.
A Charles Ives Fourth of July (June 29; 7:30 P.M.) Song, dance and story.

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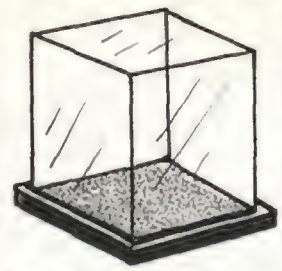

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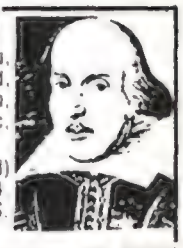

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Extended summer hours

From Memorial Day weekend through Labor Day weekend (ending September 3), most museums on the Mall will have extended hours. NASM will remain open until 9 P.M.; HM&SG, NMAH, NMNH and the castle will be open until 7:30 P.M. Extended hours at the Zoo will continue through October 15 (grounds open until 8 P.M.; buildings until 6 P.M.).

Smithsonian Institution Traveling Exhibition Service

SITES circulates exhibitions to hundreds of cities outside Washington. To sponsor a show in your community, write: SITES, Smithsonian, Washington, D.C. 20560. Here are some June exhibits:

Baltimore (June 9-August 26) *Spectacular Vernacular: Traditional Desert Architecture of West Africa and Southwest Asia*, Maryland Science Center.

St. Louis (June 9-July 8) *Building a New World: Black Labor Photographs*, Vaughn Cultural Center.

Johnson City, Tennessee (June 2-July 1) *Know What You See: The Examination and Treatment of Paintings*, Carroll Reece Museum.

Smithsonian on the air

Radio Smithsonian: Features on this half-hour weekly program include an exhibition of James Whistler's works.

Smithsonian Galaxy: Short radio features explore science, art, history.

Here at the Smithsonian . . .: Two-minute TV features include a look at the scanning electron microscope.

Smithsonian World: "Time and Light" will be on PBS television, June 6, 8 P.M.

Membership benefits when visiting the Smithsonian

"Planning Your Smithsonian Visit," a booklet replete with helpful information, is part of a free Associates' pre-visit packet; send postcard request or phone Associates' Reception Center, Smithsonian Institution, Washington, D.C. 20560, (202) 357-2700; for hearing impaired, TDD (202) 357-1729.

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Highlights continued

It came from inner space

A scanning electron microscope lets the scientists at NMNH find a whole new world in there

For the past 14 years, researchers at the National Museum of Natural History have been working with a remarkable tool, the scanning electron microscope (SEM). Using the energy of electrons that are focused by magnetic fields, rather than using the glass lenses and light of older microscopes, the SEM has turned these scientists into space travelers—only this time it's inner space, not outer. While the optical microscope transported them to a world magnified up to 2,000 times, the SEM can carry them to one magnified 100,000 times.

"Exploring Microspace," an exhibit at NMNH organized with help from the Armed Forces Medical Museum, conveys the excitement of this inner-space travel. Twelve historical microscopes, accompanied by images of organisms as seen through them, are followed by a SEM, which looks something like an airliner's cockpit. It is worked by museum technicians, so that whatever object they examine is shown above on a TV monitor. Visitors can ask about how it works, or about the 180 SEM photographs displayed (below), many of which reveal details never before seen(not by *human* eyes, at least).
Constance Bond

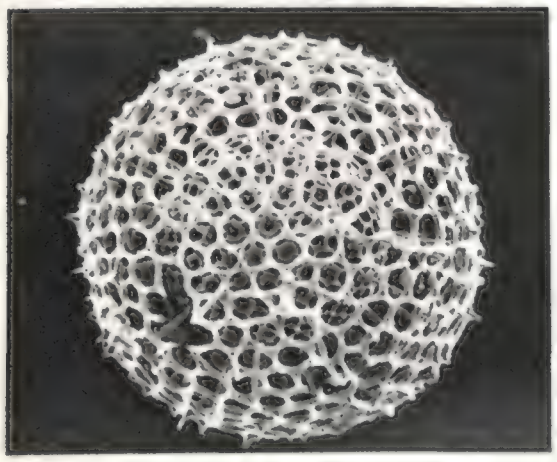
A common ant is among the "monsters of microspace" revealed by the SEM.

Hairy pads on housefly's feet enable it to walk up walls.

Fearsome weapon is barbed stinger of a honeybee.

Starfishlike tufts cover the underside of a tropical leaf.

Two-layered geodesic structure supports the body of a plankton.



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Domestic Study Tours

Connecticut Antiques June 17-24: Tour New England's scenic countryside visiting 18th-century villages, antique collections and private homes.

Family Weekend June 27-July 1: A special program to share the treasures of the Smithsonian and the monuments of the capital with your children ages 7 to 14.

Journey on the Green River July 20-30: Master the skills of white-water river running through Utah's Desolation and Gray Canyons.

Geology in the Colorado Rockies July 29-August 4: Hike the majestic Pikes Peak area to examine geological formations and fossil specimens.

Yosemite's High Country August 4-11: From a base camp near Tuolumne Meadows explore the remote areas of the Sierras.

Middle Fork August 5-13: A thrilling white-water raft trip down Idaho's beautiful Salmon River.

Crow Canyon Archaeology August 5-12: Join archaeologists near Mesa Verde, Colorado, to participate in a dig at an ancient Indian site.

Colorado Railroad and Mining History August 10-18: Ride steam trains on scenic mountain railroads, sleep in Victorian inns and explore old mining towns.

Along the Bozeman Trail August 18-25: Crow Indian Fair, rodeo, raft trip and Yellowstone highlight this tour of the Plains Indians country.

Grand Canyon August 24-September 3: A sublime spectacle seen on a raft trip down the Colorado River.

Jackson Hole: Cowboy Country August 26-September 2: Visit a working cattle ranch to learn the myth and reality of the American cowboy.

Bryce, Zion and the North Rim September 3-12: Hike canyon trails examining foliage, wildlife and geological history.

New England Seaports September 13-23: Visit Nantucket, Martha's Vineyard and Newport to trace the history of the great seafaring era.

Pueblo Indians and Spanish Villages of New Mexico September 30-October 8: Visit craftsmen, museums and private collections in Santa Fe, Taos and Albuquerque.

Opera in New York October 18-21 or November 8-11: Attend performances and tour behind the scenes with an opera soloist.

Delta Queen October 18-26: Steam up the Mississippi from New Orleans to Memphis.

Coming in November: A tour of Los Angeles art and architecture.

Washington "Anytime Weekend": Plan a summer weekend to visit the Smithsonian museums. Package includes hotels, meals and exclusive tour of Smithsonian castle. Reservation and payment must be received at least ten days prior to arrival.

Foreign Study Tours

These tours range in size from small group experiences to charter adventures and vary in price from low-cost to deluxe, depending on the type of travel, destination and length of trip:

People's Republic of China, 1984: Retrace the Silk Route, climb China's sacred peaks, cruise the Grand Canal or Yangtze River, explore back roads or study decorative arts and antiques. Exclusive tours are led by a Sinologist and include intensive pretour briefing.

Greece June 16-July 1: From Athens, travel through magnificent mountains to the sites of ancient civilizations.

Cotswold Countryside June 24-July 8 or July 8-22: Stay in Cirencester, in the midst of England's ancient green hills.

Iceland July 24-August 7: Travel a rugged terrain of glaciers, hot springs and majestic waterfalls. Visit outpost fishing and farming communities to meet today's pioneers of the Far North.

Island World of Britain July 30-August 13: Circumnavigate Great Britain aboard the *Argonaut*. Lectures and onshore excursions explore prehistoric ruins and contemporary economic issues, great houses and village hamlets.

Scandinavia and the Baltic August 4-18: Begin in Copenhagen, gateway to the Baltic, then board the *Illiria* for port calls at enchanting Baltic islands and the impressive cities of Tallinn, Leningrad, Helsinki and Stockholm.

Kenya August 9-26: Observe wildlife on exciting safari to Masai Mara, Amboseli, Lake Nakuru, Kilaguni and Lewa Downs.

Odyssey of Flight September 4-17: National Air and Space Museum experts lead a grand tour of aviation-related activities in England, Germany and Switzerland. Includes the Farnborough International Aerospace Exhibition.

Gulf Islands September 6-13 or 13-20: Cruise between Vancouver and Victoria, British Columbia, on a 68-foot sailboat and learn about the islands' rich natural history.

Oxford/Smithsonian Seminar September 14-29: Attend classes, lectures and field trips led by Oxford faculty while enjoying the special ambience of this famous university and town.

The Ancient World of Peru September 29-October 14: Visit Lima, Cuzco, Indian markets and amazing Machu Picchu.

Egypt and the Nile September 30-October 19: Voyage from Cairo aboard a chartered riverboat to impressive historic sites.

Canals and Countryside October 1-12: Cruise through English and Welsh countryside on famous canals, experience the working of locks and explore picturesque inland towns and villages.

Istanbul and Beyond October 7-21: An adventure tour to Istanbul and Asiatic Turkey and a cruise on the Bosporus. Plus excursions to Aegean Turkey, or Anatolia and Cappadocia.

Classical Greece October 13-24: Sail through the Aegean aboard the *Argonaut* to the grand sites of antiquity.

The Atlantic Crossing December 6-21: A sailing adventure from the Canary Islands to Martinique on the square-rigged, four-masted *Sea Cloud*.

Coming in December: Celebrate a traditional Christmas either in Austria or in England's Canterbury.

Write National Associates, A&I 1278 Smithsonian Institution, Washington, D.C. 20560 or call (202) 357-2477 for specific tour brochures

in Washington

Selected Studies Seminars

Enjoy the treasures of the Smithsonian in unique, popular programs and special behind-the-scenes tours. Choose from:

18th-century French Art July 15-20: William Kloss lectures on this age of extravagance famous for its splendid art and lavish patronage. Includes tours of the two special summer exhibitions at the National Gallery of Art. Summer hours will allow leisurely evening as well as daytime visits.

History of American Architecture September 30-October 5: Experts focus on the diversity of styles and the many gifted architects who have created a unique tradition of great beauty and importance. Includes an all-day trip to Frank Lloyd Wright's romantic Fallingwater, one of the most famous American houses of the 20th century.

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Genealogical Research October 21-26: Taught by Milton Rubincam, Marilyn Duncan and other authorities, participants learn how to conduct research in major genealogical repositories.

Connoisseurship of Chinese Art November 4-9: Expert Shirley H. Ganse lectures on fine Chinese decorative arts and paintings in private and public collections, developing an eye for the best in terms of style and technique and detection of copies and forgeries. Includes private guided tour before public hours of the acclaimed exhibition, "Treasures from the Shanghai Museum—6,000 Years of Chinese Art," featuring hundreds of objects never before seen in the United States.

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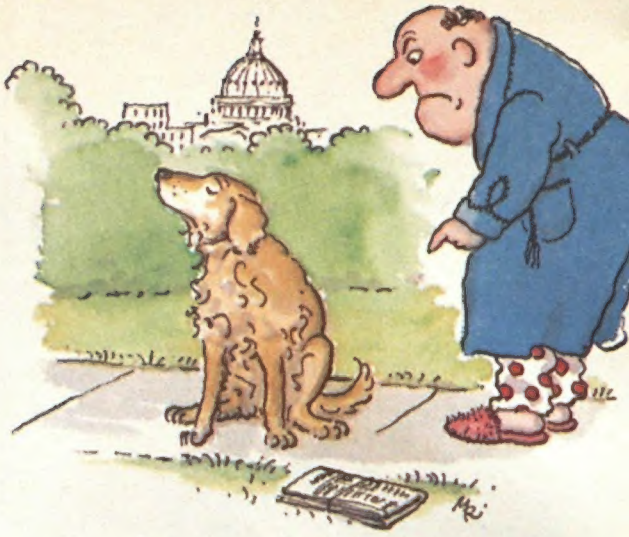
By Timothy Foote

Getting a real grip on the news



Before we moved down to Washington last year, New Yorkers kept telling us what a shock it would be, getting used to life in the provinces. And how right they were!

Take the Washington subways, for instance. After the adrenaline-stirring din and danger of Manhattan's rabid transit system, it caused instant culture shock to ride in safe, clean and quiet Metro cars. We found it hard, too, learning to cope with a city where people are mostly polite. At first there was a tendency to burst into tears of unmanly gratitude at the least kindness.

The real test, though, was saying goodbye to the *New York Times*—and hello to the *Washington Post*. My wife and I are fairly flexible. The problem was the family retriever. She had always been addicted to the *Times*. Would she give up the Sulzbergers' stodgy but compendious product in favor of *commedia dell'arte* journalism?

Anyone who thinks the question frivolous hasn't lived with a golden retriever. Ours is a benign creature named Pamela, but a retrieving demon. Not just sticks, stones and rubber bones, but slippers, boots, ladies' purses, umbrellas, now and then a briefcase. Even neckties, especially if still attached to any visitor foolish enough to kneel down and say hello.

Mornings without number it has been her practice to appear (mouth full of boot or sock) beside the bed of some beloved but luckless drowser and sit patiently, melting brown eyes on the victim, refusing to release her gift until offered suitable pats and praises. There are no shortcuts. My son, whose dog she officially is, was especially favored—and usually delighted—by this morning-gift ritual. Some days, though, when he badly overslept, we could hear him shouting "Damn it, Pam! Skip the gift! I'm late for school."

For years she had also plunged forth to fetch in the *New York Times*. Sundays were the unhappy exception because the Sunday *Times* is all but irretrievable. Grown men have got hernias from it. Most days, though, the *Times* landed on the sidewalk at the right heft for a retriever—about the size of a wood duck.

Even so, we did not fully realize how committed the dog was to this sort of information retrieval until a few years back when the *Times* went on strike. The first *Times*less morning she crisscrossed the lawn expectantly, feathery tail flashing—and found nothing. Eventually she returned, empty-mouthed, tail drooping. And each day, as the strike ran on, the dog's dejection deepened. We tried extra bones, extra runs along the nearby Hudson, various skinny local tabloids. Nothing seemed to help, until at last we faced up to what had to be done. Each night somebody had to creep down to the basement and collect an old copy of the *Times*, put a rubber band around it, stuff it into the requisite plastic sack and—being sure the dog was in for the night—deposit the decoy paper at the lawn's edge.

How proud she was the first day we executed this deception! Needless to say, though, the operation put a certain strain on our domestic life. Late on icy nights one of us would think to ask: "Did you put out the *Times*, Dear?" Clearly implying, "If you didn't, you'll have to get up and do it now."

Once we settled in Washington, the *Post* began to plunk down outside the house each morning. But the great dog was rather lackluster about it. Sometimes you'd have to give her a hint. "Fetch the paper, Pam!" Things like that. Then she would mosey over, lay a reluctant tooth on it, bring it back—and wander off as if she'd lost something. We wondered what was wrong. Could it really be some subliminal matter of editorial weight? Some canine sense of the *Post*'s essential frivolity, as against the satisfying memory of the fully-indexed, globe-girdling newspaper-of-record *New York Times*?

"She'll adjust," we said, as we more or less cheerfully began to grow used to the *Post*'s eccentric clutch of scriveners: the meandering charms of its garden expert, the civilized restraint of an editorial writer, the perpetual pique of a resident book critic. We even developed a certain tolerance for a comic columnist who, early on, had whined so about Washington's Metro that we wanted to drag him up to New York, stuff him on a late train to Canarsie and see how he liked it. Each day, too, we took the dog into the unlittered park nearby so she could get used to the capital's canine speech rhythms by reading the news printed on trees and tufts of grass.

And gradually Pamela began to come around. There was a new spring to her step as she sailed forth to retrieve our daily paper. Then a great day came. It was a snowy Sunday. Unlike the *Times*, the Sunday *Post* produces a paper about the size of a smallish Canada goose, but still portable. The dog, in fact, had just recently learned to work her large jaws around it, raise it high and proudly parade back to the door. But this day she did something different. "Come, look!" my wife called. "Look at Pam!" The dog had dropped the Sunday *Post*, then thrown herself on top of it and was rolling the paper deliriously under her shoulder blades, the way she does with a tennis ball, waving her paws in the air. "She never did *that* with the *New York Times*!" my wife exclaimed.

"Let's face it," I said. "The *Post* has a lot of charm."

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